

The IRON AGE

September 17, 1959 A Chilton Publication

The National Metalworking Weekly



Westinghouse's Shue, Bell, and Rhine

To Get Full Results,
Automation Needs
Total Support P. 103

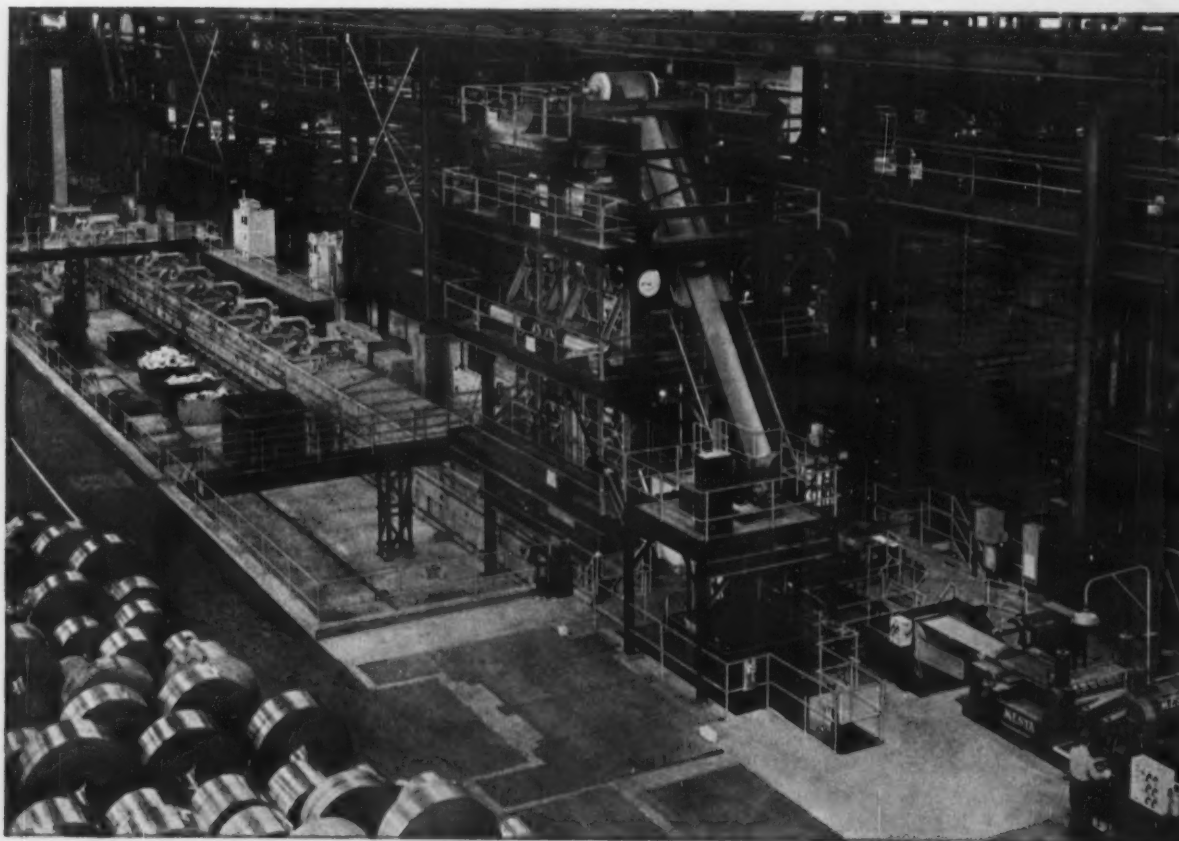
Iron Ore Tieup Nears
Critical Point — P. 63

Data Handling Gives
Better Sales Control — P. 77

Digest of the Week — P. 2-3

Continuous
galvanizing lines

Designed and Built by
MESTA

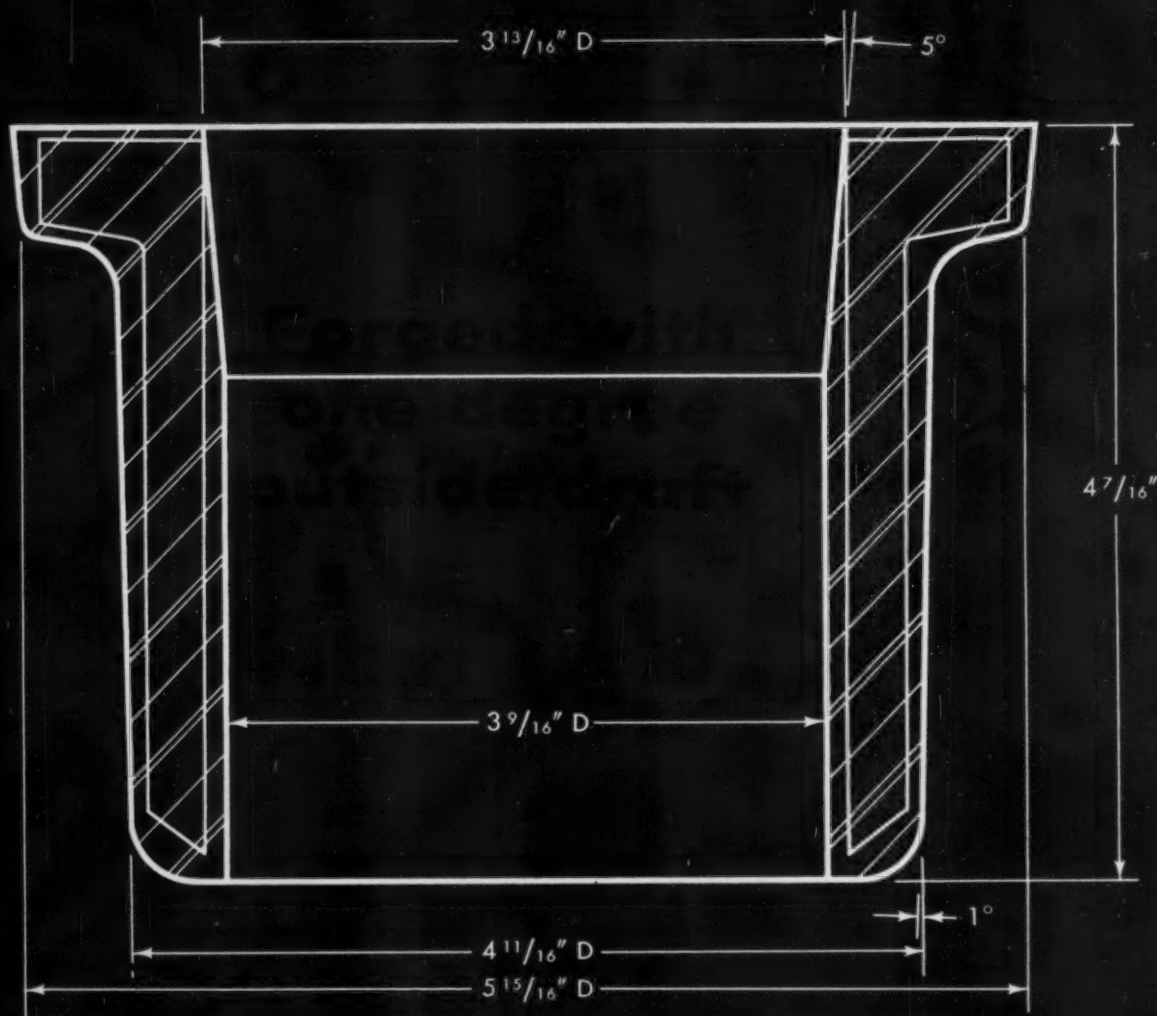


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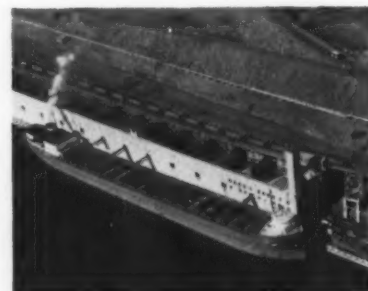
September 17, 1959—Vol. 184, No. 12

Digest of the Week in

NEWS ARTICLES

IRON ORE

Shortage Ahead—Steel mills face a big and expensive problem in keeping blast furnaces operating through the winter. Strike-idled ore



operations have lost much shipping time that can't be regained. Foreign ore may be a big help. P. 63

DOLLARS FOR IDEAS

Budgets Up—American industry has increased its budget this year to expand research and development programs. P. 66

DIECASTING

Big Comeback—Optimism is the keynote at the annual meeting of the American Die Casting Institute. Business is running 20 pct better than last year. P. 68

DATA HANDLING

Facts Are Vital—Data processing can be a valuable aid to man-

*Starred items are digested at right.

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Metalworking



COVER FEATURE

HELP AUTOMATION — This management team from Westinghouse's Bellefontaine Plant knows that automation doesn't stop at the plant floor. Stepped-up production means changes in sales, purchasing, and engineering. E. L. Shue, J. E. Bell, and C. R. Rhine lead the way. P. 103

agement. It can pinpoint areas of strength and weakness early. P. 77

NUMERICAL CONTROLS

On the Uptrend—Look for many new developments on numerical controls. Smaller shops which can't afford big transfer lines will provide the big market, and stand to get the most benefit. P. 89

FEATURE ARTICLES

SMOOTHER SINTERING

Through Modernization—How can you improve sinter-plant production? That's an important question, since sintering will become more and more vital to blast furnace operations. A review of available controls sheds light on ways to improve the four areas of sinter production. P. 106

UNDERWATER EXPLOSION

Forms Critical Metals—A successful test just made releases 6000 hp from a simple electrical force in lightning speed. Engineers are hopeful that this force can shape the difficult space metals. P. 109

PRECISIONED FILTERS

Halt Breakdowns—A critical problem in aircraft and missiles traces straight to the dirt and dust that enter hydraulic systems. A good way to keep the contaminants

out is to install a special two-micron filter for clean oil flow. P. 110

BRAZE HONEYCOMB

In Electric Blankets—Small companies can't afford to buy brazing furnaces for short-run production jobs. Use of high-temperature blankets provides direct transfer of heat by conduction to the stainless honeycomb panels. P. 112

CUT MACHINING COSTS

In Production—Research indicates that the Cooperative Machining Project is living up to all expectations. Its second report shows how to machine a typical large-volume work component at the lowest cost per piece. P. 114

MARKETS & PRICES

ALUMINUM MARKET

Biggest New One—When the American Bureau of Shipping approved the world's first liquid methane tanker it opened the door

to what may prove to be the biggest new aluminum market to come along in years. P. 67

CORVAIR DETAILS

Prices Announced—Lowest list price for the Corvair will be \$1810. But when all charges are added, cost to buyer will run at least \$2000. Chevrolet expects to sell 300,000 of them next year. P. 81

STEEL SUMMARY

Emergency Here—The steel market is now at the emergency stage. Even if the strike should end momentarily, production cutbacks could not be avoided. Signs of the emergency are conversion deals, broker steel, and sold-out warehouses. P. 147

INDUSTRIAL SCALE PRICES

Increase Possible?—Scale manufacturers are keeping a close watch on the steel labor negotiations. They fear an increase in steel prices would mean a boost in scale prices also. P. 148

NEXT WEEK

ENGINEERING FORECAST

For Space Age—When some of the best minds in the nation are polled for their opinions about engineering trends, there's bound to be food for thought. Next week's technical feature interprets metal's role in these trends.

CAPITAL SPENDING

New Appropriations—The quarterly survey of metalworking's capital appropriations will show trends in new capital spending. It is conducted for The IRON AGE by the National Industrial Conference board as a continuing feature.



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FOR COMPLETE INFORMATION ON DAMASCOPE TESTING

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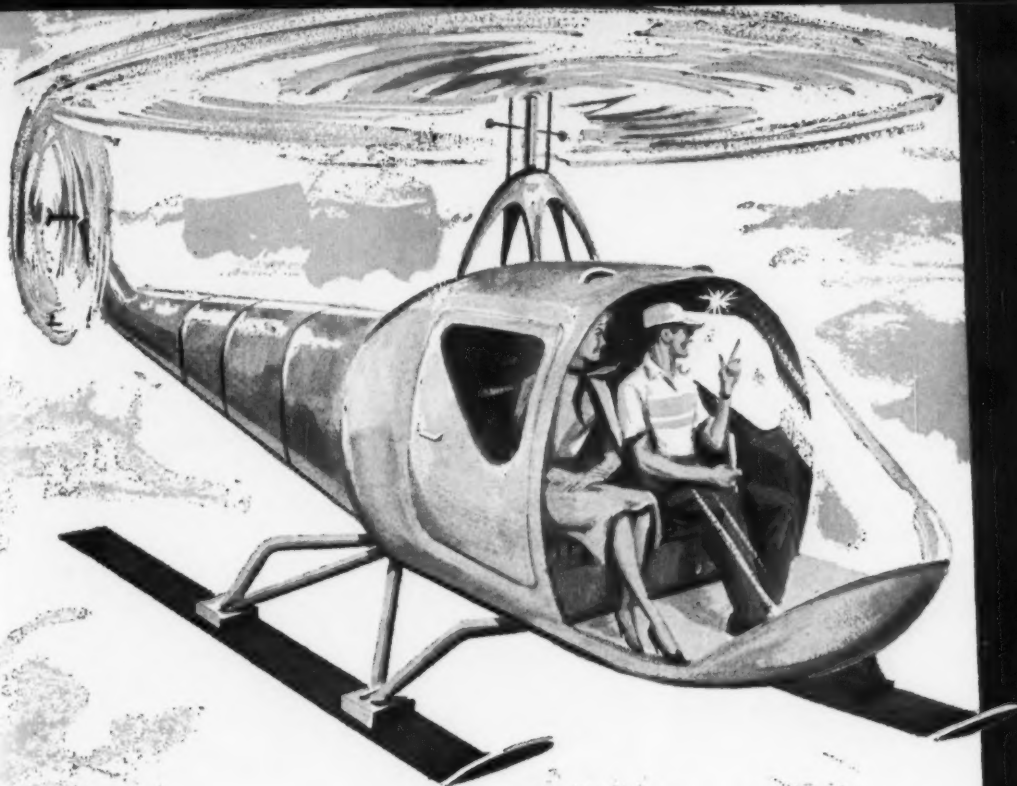
MEETS A.S.T.M. SPECIFICATIONS—Damascop is a new and improved method of RADAC eddy current testing. It consistently reveals surface and sub-surface cracks, seams, splits, holes, inclusions and other discontinuities not revealed by any other inspection method. On production run testing, Damascop's range of sensitivity exceeds requirements for pressure tubing outlined in A.S.T.M. Book of Standards, Part I.

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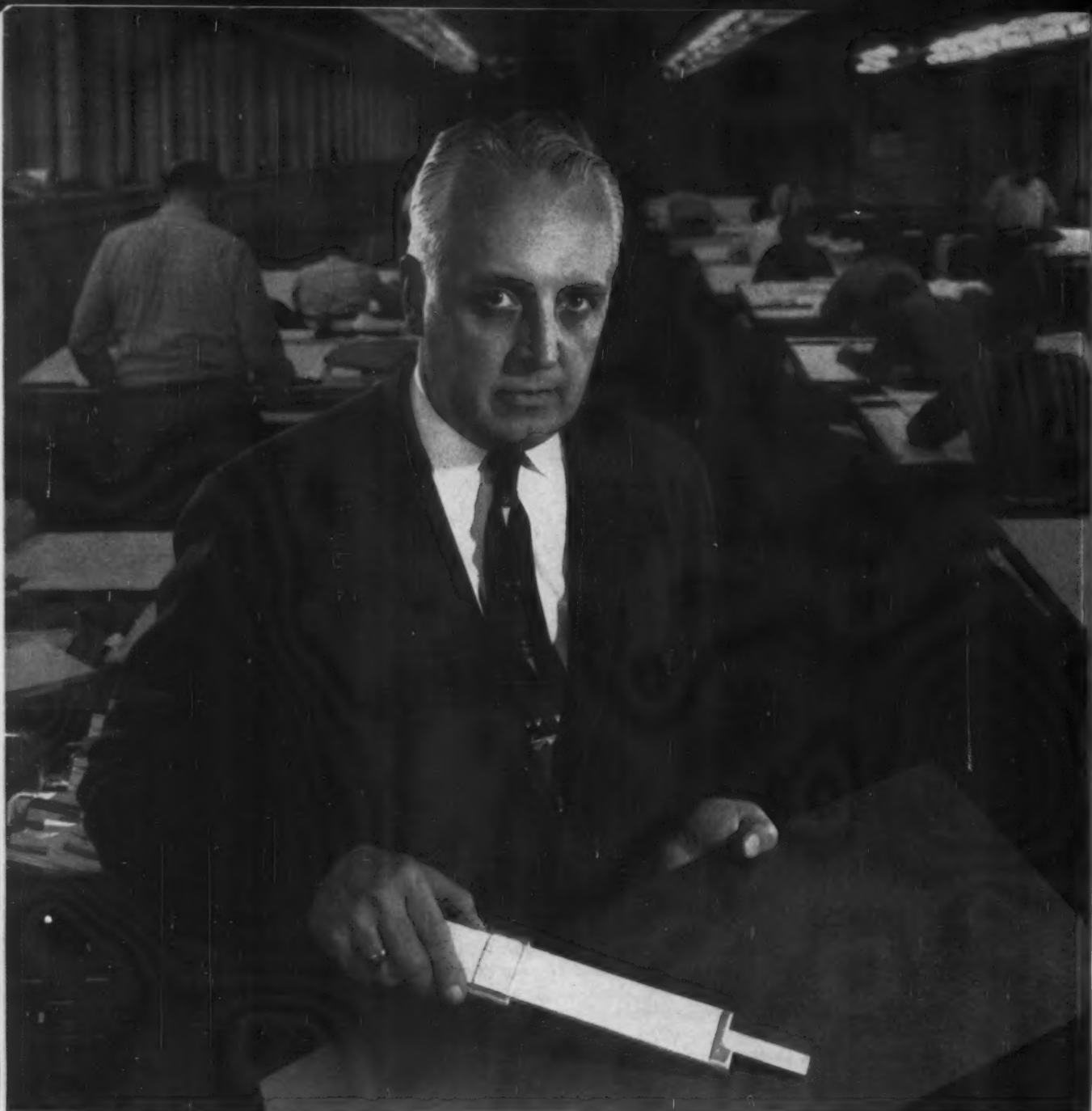


PHOTO BY KAREK OF GETTYSBURG

"To achieve best design results—we must have steel of consistent quality" —J. W. HUBLER, vice president engineering, Macomber Incorporated, Canton, Ohio.

"Engineers of construction products rely heavily on sources of material supply"—says J. W. Hubler, vice president of engineering at Macomber, one of the nation's foremost manufacturers of steel joists, roof decking, and structural steel framing.

"Because the relation of strength to weight is vitally important in the construction business, we design to give the architect the strongest, lightest, easiest-to-use product possible. To do this we must be sure the steel is right—every inch of it. For steel of consistent analysis and quality, we can rely on Sharon Steel Corporation, Sharon, Pa."



SHARON *Quality* **STEEL**

The Age of Cynicism: When Haven't We Had One?

Take down the crepe, boys. All is not lost. Strikes don't last forever. Mr. Khrushchev is a mortal like anyone else, subject to life's setbacks—and lessons.

Your government is not going broke. Some way will be found to get Treasury Secretary Anderson off the hot money seat. The Federal Reserve Board will never give in to the 5 percenters—those who think a little inflation won't hurt anyone—except those it snows under.

Labor's battle with management is good for labor. It is getting too big for its pants anyway. You can't have your way all the time.

Management's tougher stand on some things is about overdue. Industry learned its lesson long ago, well enough to know when to call a halt to things the public won't stand for.

The government is going to keep its nose out of labor and management fights as long as Mr. Eisenhower is in the White House. If the two can't settle willingly, then there is always Taft-Hartley. If that fails there is always an aroused public opinion.

The defense of the country is not going to be torpedoed. It will go on in sufficient strength with no backdown by this or any other Administration. The armchair diplomats and generals

don't have all the facts. If they did they would not be armchair strategists.

Our youth—the great majority—will not turn into lazy slobs. As they get their bounces and their setbacks, they will react as you and I did. The result will be about the same—or better, we hope.

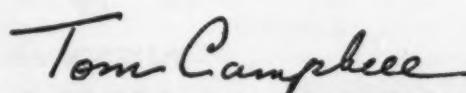
Those who won't work and think ahead of their competitors will just run second, third or not at all. But was it ever any different? The egg-heads will always look down their noses at their outgoing confreres. What's new here? Each has his place and his worth.

The easy life may make us soft. But it will never make us so soft we can't get hardened right smartly—when emergencies come. Soft living is only skin deep: The will to survive is soul deep.

The H-bomb is relatively no more horrible than the black plague was in its time. If we grow so stupid that we wipe ourselves out with the atom that would be our just due. But we won't.

The tensions of everyday life are tough—only if we let them get us down. Now if all this is super-optimism, make the most of it.

Despair gets us nowhere!



Editor-in-Chief



CASE HISTORIES



N/D achieves maximum axial and radial rigidity by matching two or three super-precision angular contact bearings having different contact angles. See figures 1 & 2 below.

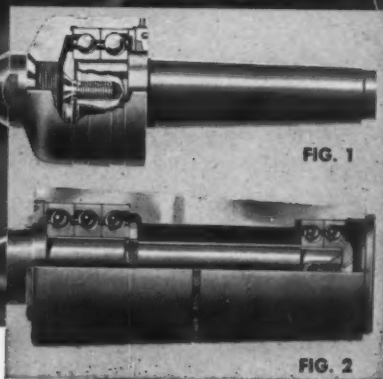


FIG. 1

FIG. 2

Photo: courtesy Ready Tool Company

Bearing Design Helps Live Center Maker Achieve Accuracy of .000050"!

CUSTOMER PROBLEM:

Live center maker requires bearing design that will help achieve . . . and maintain . . . live center accuracy of .000050", under combination radial and thrust loads.

SOLUTION:

After thorough evaluation of the problem, New Departure recommended N/D pre-loaded, duplex ball bearings. Extensive testing proved these super-precise ball bearings resisted combination radial and thrust loads with minimum deflection. The N/D ball bearings, with medium and high contact angles, are mounted

duplex and positively clamped together to assure the optimum, pre-determined preload condition. As work expansion increases the thrust load, radial centering becomes more rigid and accuracy is precisely maintained . . . to less than .000050" total indicator run-out!

When you're working on new designs that call for high precision ball bearings, why not call on New Departure? New Departure's consistent precision is your assurance of the ultimate in accuracy for your design. For more information, call the New Departure Sales Engineer in your area or write Dept. S-9.



NEW DEPARTURE

DIVISION OF GENERAL MOTORS, BRISTOL, CONN.

NOTHING ROLLS LIKE A BALL

Replacement ball bearings available through
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Heat-Transfer Rates

A new principle of power convection, announced by Surface Combustion Corp., circulates air at speeds up to 200 mph and achieves higher rates of heat transfer. The process is said to increase rates in cooling and heating and to increase the uniformity of heat treatment in controlled atmospheres. Use of the principle permits the design of furnace equipment that raises production.

Sports Car Improvements

Although Chevrolet's 1960 Corvette has retained the same basic body styling of recent years, some mechanical features will be added to the popular sports car. One of them is an aluminum cylinder head offered as optional equipment on the fuel-injection model. Corvette sales in 1959 are expected to exceed 10,000.

Building Diesel Engines

A new line of diesel engines will be introduced by an American producer late this month. The manufacturer states that they will be the first American-built diesels ever to be made available for light and medium trucks. The company says it will offer the lowest initial cost per horsepower for any automotive diesel ever known.

Fast Cutting Abrasive

A trend may develop for greater use of silicon-carbide materials in barrel finishing. Recent tests indicate that silicon-carbide triangles and other extruded shapes are highly desirable for barrel finishing. They may compete with aluminum-oxide types.

Fewer Weapons Systems

Earnest thought is given by the Air Force to reducing numbers and types of weapons systems. Mounting procurement costs make a luxury of multiple types of planes and missiles. A long-range supersonic aircraft, built to handle offen-

sive, defensive, and heavy-lift missions, could ease the cost pinch. Some top air generals see the forthcoming B-70 in this role. If the B-70 is so used, other weapons projects may be scrapped.

Guards Against Corrosion

A neoprene rubber-based coating that provides chemical, abrasion, and weathering resistance for protecting metal, wood, concrete, cloth, and some plastics is now on the market. It has high adhesion to unprimed steel, aluminum, copper, galvanized steel, concrete, wood, and glass-fiber reinforced polyester plastics. The coating air cures to a tough rubbery film that guards against corrosive action of chemicals and fluids.

Oxygen Steelmaking Site

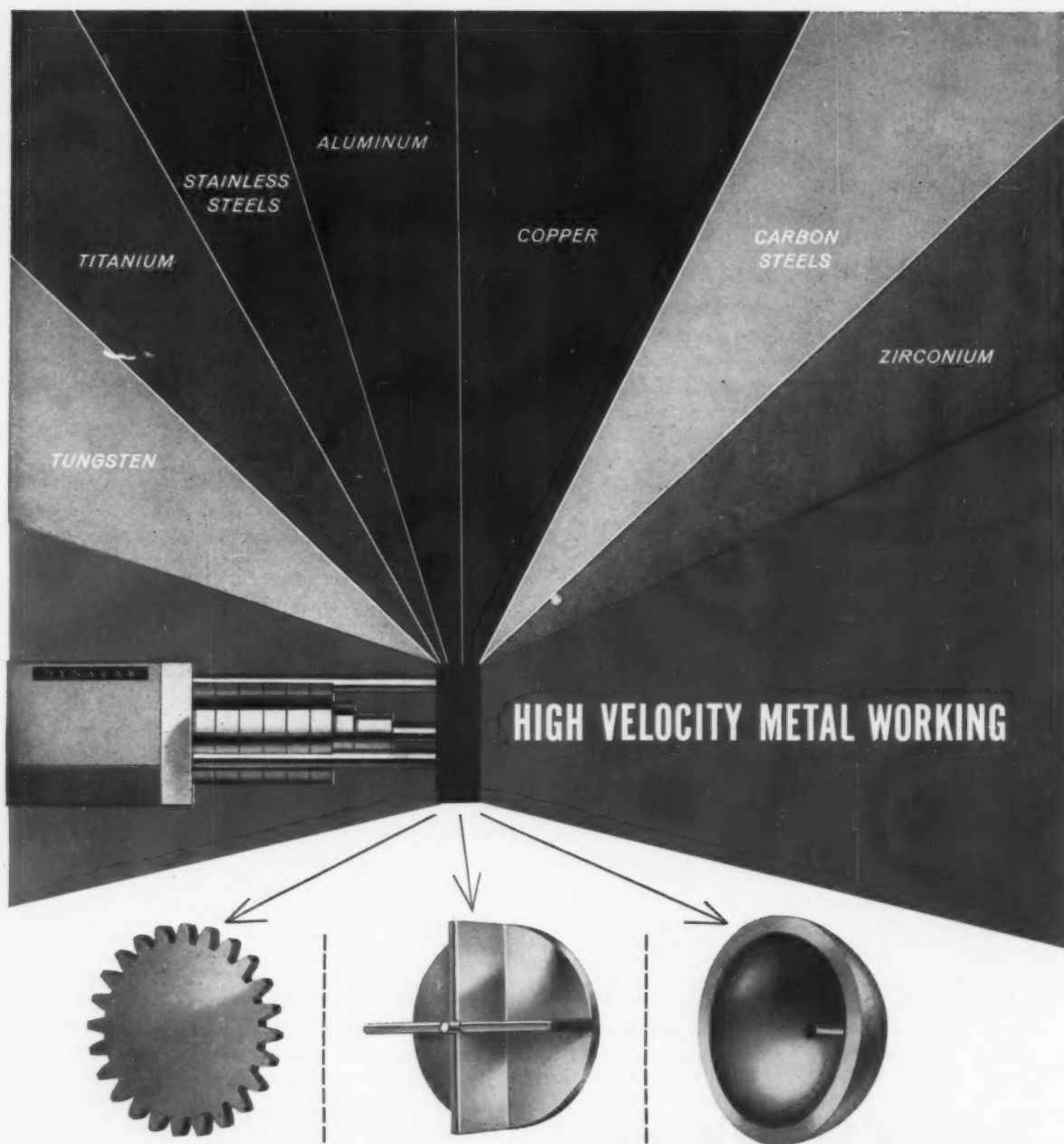
Look for an announcement within the next few weeks concerning a western site in basic oxygen steelmaking. Financial arrangements have been completed and bids have been submitted on two vessels. At least five companies are said to be bidding on the job.

Japanese Want Quality

West Coast iron ore may be in for a push soon. Japanese companies want higher grade ore than they've been getting from the western U. S. and are trying to nudge our mining setups into developing it. Japan's only alternative is communist north China, a move it doesn't want to make. Development of good nearby sources might also revive long-laid plans for a blast furnace in the San Francisco area.

Manned Space Flight

A new radio-energized heat-testing device simulates high temperatures encountered in space flight. Being built by General Electric for the Air Force, the new electronic equipment is said to be the first of its type in the world. Known as "Project Heat," the system to aid manned flight concentrates ten million watts of radio-frequency energy in a relatively small area of about 100 sq ft.



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LETTERS FROM READERS

Problem Employees

Sir—I read that Dr. McMurry's solution for the brilliant "malcontent" is to "separate" him. It is interesting to speculate on where our standard of living would be today if industrial psychology had been a fad in the days of Edison, Ford, and Steinmetz. These men were malcontents as are all creative people to some degree.

Managers who subscribe to the well adjusted cult of mediocrity take pride in treating everybody just alike including the brilliant engineer. If a man is contributing two or three times as much as anyone else toward keeping the company in business, there is no reason he should not be rewarded accordingly.

If a manager cannot create a climate which will channel the energy of the brilliant person into constructive lines, then it is the manager who is the luxury which the company cannot afford.—F. P. Gooch, Chief Engineer of Mechanical Development Dept., Research Laboratories, The Sharples Corp., Bridgeport, Pa.

■ In a recent three-part series, industrial psychologist Robert McMurry discussed problem employees and how to handle them.

In referring to the brilliant "malcontent," we believe Dr. McMurry was considering the hostile, destructive type, not the type of men represented by Edison, Ford and Steinmetz. These men, while discontented, were constantly seeking better ways of doing things, not plotting to hamstring management.—Ed.

Salute Clarified

Sir—It is an honor to receive the attention of your fine magazine, and I appreciate the Salute given the Twin Coach Company and myself in your August 27 issue.

There is, however, one notable error I would like to point out. It is in connection with the statement that our company recently entered the aviation-missile field.

Actually Twin Coach is no newcomer to aviation. The majority of the top management in our organization and our skilled craftsmen spent many years at the Curtiss Wright Aircraft Division in Buffalo. This group was instrumental in helping build the amazing production record during World War II of approximately 30,000 aircraft.

At war's end Curtiss went out of the airframe business in Buffalo and Twin Coach acquired a plant there for bus manufacture. By 1949, however, this group was back in aviation subcontracting and Twin's aircraft sales have exceeded \$200 million since that time.—W. H. Coleman, President, Twin Coach Co., Cleveland.

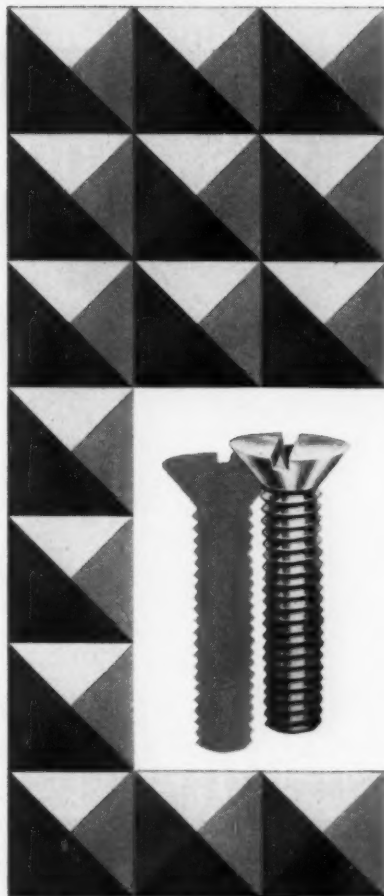
Lube Dollar

Sir—Would you please send me a copy of your article "How To Get More For Your Metalworking Dollar—Lubrication" which appeared in the Aug. 20 issue.

This is an excellently presented, well-thought-out article for which you should receive many compliments.—R. C. Slover, Marketing Dept., Lubrication and Commercial Sales, Esso Standard Oil Co., New York, N. Y.

Sir—Will you send me four reprints of this article to be given the industrial salesmen under my supervision.

This is an exceptionally good article and points up and brings out the essence of our own thinking on organized lubrication.—J. H. Shaffer, Supv. Lubrication Engineer, Cincinnati Dist., Texaco Inc., Cincinnati, O.



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FATIGUE CRACKS

The Top Ten

Each year the U. S. Government Printing Office sends out thousands of publications on a wide variety of subjects.

After gaging public response the office has listed the ten which seem most popular. Some of the titles most requested are not surprising. Others are.

Self-Help Advice — You might expect to find such titles as "Your Social Security," "U. S. Income and Output" and "Starting and Managing a Small Business of Your Own" among the top ten. And they are.

But would you also select "Wood . . . Colors and Kinds," the "Wood Handbook," and the "Space Handbook: Astronautics and Its Application"?

Evidently mothers are looking out for their offspring from the cradle on up. Two more of the titles are "Infant Care" and "Future Jobs for High School Girls."

And Two Make Ten—Not to keep you in suspense, the last two of the big ten are "Federal Benefits Available to Veterans and Their Dependents," and "The Communist Party of the United States of America, What It Is, How It Works—A Handbook for America."

And all the above are available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Tribute to Federico

This week, Federico Strasser a frequent contributor to IRON AGE's technical section, becomes the 1959 winner of the Presteel Award.

The award, which honors a substantial contribution in the field of metal stampings, is made jointly by the Pressed Metal Institute and the Worcester Pressed Steel Co.

Mr. Strasser, who specializes in

articles on press tools and metal stampings, is a prolific lecturer and author. Chilton Co., publishers of IRON AGE, will bring out his first book, "Practical Design of Sheet Metal Stampings" this fall.

Born in Hungary, Mr. Strasser studied engineering in Italy. He worked there and in Germany. Since 1939 he has lived in Santiago, Chile, where he is a partner in a manufacturing company.

He will receive the Presteel Award during the annual meeting of the Pressed Metal Institute in Estes Park, Colorado.

New Puzzler

A man with no other money took a check to a bank to cash it. In error, the teller gave him the number of dollars specified on the check as cents and the number of cents specified as dollars. Subsequently the man spent twice the amount indicated on the check and then had left one-half as many cents as the number of dollars specified on the check. What was the amount of the check?

Wish we had a teller like that!



"Did you advertise for a young man willing to accept a challenge?"

Introducing... Oilmacs!



See? Oil actually runs right off specially treated Oilmacs. As you know, untreated gloves soak up oil like a blotter.

**Oil-resistant terry
cloth work gloves...
by JOMAC®**

Free sample pair will convince you . . . oil runs off these new Jomac gloves like water off a duck's back! Moreover, Oilmacs are far more cut-resistant than expensive leather gloves . . . are interchangeable . . . and can be reconditioned with virtually no loss in oil resistance. Mail coupon now . . . and you will soon start replacing those heavy, oil-soaked gloves with light, flexible Oilmacs!

**MAIL THIS COUPON
TODAY FOR
FREE SAMPLE PAIR!**

JOMAC[®] Inc. Department K
Philadelphia 38, Pennsylvania

I'm interested! Please send free sample pair of Oilmacs, your new oil-resistant terry cloth work gloves.

Name _____

Company _____

Address _____

City _____

State _____



MIDVAC *Micro Lustre*

**VACUUM MELTED FINISHING ROLLS HAVE
CUT REGRINDING TIME IN HALF**

The super uniformity of fine grain structure, maximum freedom of defects and non-metallic inclusions of Midvac Rolls have proved their value in mills from coast to coast. The Micro Lustre finish of these vacuum melted steel finishing rolls assures rolling surfaces free of imperfections... longer trouble-free service between grinds... and savings in refinishing time as much as 50%.

Midvac Rolls, made with consumable electrode vacuum melted Midvac Steels make it possible for operators to refinish rolls quicker to a higher polish which produces finer sheets. That is why these rolls are being specified for rolling stainless steel, aluminum, foil, brass and precious metals... as well as paper, plastics and rubber. Write for complete data on these and other forged rolls of any size produced by M-H.

MIDVALE-HEPPENSTALL COMPANY

NICETOWN, PHILADELPHIA, PA.

Subsidiary of HEPPENSTALL COMPANY, Pittsburgh, Pa.



MH

Midvac Rolls

COMING EXHIBITS

Instrumentation Show — Sept. 21-25, International Amphitheatre, Chicago. (Instrument Society of America, 313 Sixth Ave., Pittsburgh 22.)

Metal Show — Nov. 2-6, International Amphitheatre, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

MEETINGS

SEPTEMBER

Steel Founders' Society of America — Fall meeting, Sept. 21-22, The Homestead, Hot Springs, Va. Society headquarters, 606 Terminal Tower, Cleveland.

Electronic Industries Assn. — Quarterly meeting, Sept. 22-24, Plaza Hotel, New York. Association headquarters, 1721 DeSales St., N. W., Washington 6, D. C.

Porcelain Enamel Institute, Inc. — Annual meeting, Sept. 24-26, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1145 19th St., N. W., Washington 4, D. C.

Association of Iron & Steel Engineers — Convention, Sept. 28-Oct. 1, Sherman Hotel, Chicago. Association headquarters, 1010 Empire Bldg., Pittsburgh.

American Welding Society — National fall meeting, Sept. 28-Oct. 1, Hotel Sheraton-Cadillac, Detroit. Society headquarters, 33 W. 39th St., New York.

OCTOBER

National Assn. of Sheet Metal Distributors — Annual meeting, Oct. 4-7, Atlantic City, N. J. Association headquarters, 1900 Arch St., Philadelphia 3.

The Material Handling Institute — Joint industry fall meeting, Oct. 4-8, Lake Placid, N. Y. Institute headquarters, One Gateway Center, Pittsburgh 22, Pa.

Truck Body & Equipment Assn., Inc. — Annual convention and ex-
(Continued on P. 16)

Users Report on Advantages



of Model H-25 **PAYLOADER**

"H-25 'PAYLOADER' is superior to any previous sand moving equipment used — does many jobs previously impossible with our other loaders... offers such advantages as bigger payloads, faster and more powerful, plus a considerably shorter turning radius", says O. W. Street, Supt., Parker-Street Castings Co., Cleveland, Ohio.

"Short turning radius enables it to work in close areas where the two loaders it replaced could not. It has cut the overall work period in the night crew operation from 11 to 6 hours without changing floor working conditions", says Supt. Lawrence Parker, Rollstone Foundry, Inc., Fitchburg, Mass.

"Power Steering gives the operator better control... is a great help in crowded conditions like ours", says Orrin Holm, Foreman of Baker Mfg. Co.'s foundry, Evansville, Wis.

"Power-shift transmission and power-steering makes it easy to operate and do a better, faster job... has saved at least an hour a day", says C. B. Kelton, Mgr., Decatur Foundry, Inc., Decatur, Ill.

If you want to find out what a Model H-25 can do, ask your Hough Distributor for a demonstration. See how power-steer, power-shift, "no-spin" differentials, 6-ft. turning radius, 2,500 lb. carry capacity, 4,500 lb. bucket breakout force and other H-25 features get the work done faster, better, at lower cost.

PROVEN 'PAYLOADER' MODELS — are available for every material handling purpose, indoors or outdoors... carry capacities from 2,000 to 12,000 lbs. ... and a Hough Distributor nearby to serve you.

THE FRANK G. HOUGH CO.
733 Sunnyside Ave., Libertyville, Ill.
Send Model H-25 "PAYLOADER" data 9-A-2

HOUGH®



THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY



Name.....
Title.....
Company.....
Street.....
City.....State.....



CM METEOR Electric Wire Rope Hoist

½ to 5 ton capacities—Compact, enclosed design. Low headroom. Continuous hoist-duty motor with thermal overload protection for heavy duty service. Precision bearings and helical gears for long life. Only 110 volts at push button control.

CM HOISTS

FOR { REPETITIVE PRODUCTION APPLICATIONS OR RUGGED MAINTENANCE WORK



HAND or ELECTRIC—CHAIN or WIRE ROPE

CM makes them all! So you can choose a hoist that's perfectly suited to your own needs in a safe, highly efficient CM design. Three of the most popular models are illustrated. Specifications of other types and sizes on request.

CM LODESTAR Electric Chain Hoist

¼ to 2 ton capacities—First truly heavy duty version of small electric hoist. ¼ ton model weighs only 51 lbs. Heavy duty self-adjusting mechanical brake and regenerative electrical braking. Overload protection and upper-lower safety switches. CM-Alloy load chain.

CM CYCLONE Hand Chain Hoist

¼ to 10 ton capacities—Easy to carry and lift. One ton model weighs only 36 pounds. Made of tough aluminum alloy. CM-Alloy lead chain. High efficiency. Lifetime lubrication.

ALSO
CM Pullers,
Trolleys
and Cranes

REQUEST catalog and name of local stocking distributor. →



CHISHOLM-MOORE HOIST DIVISION

COLUMBUS McKINNON CHAIN CORPORATION

TONAWANDA, NEW YORK

REGIONAL OFFICES: NEW YORK, CHICAGO, CLEVELAND

In Canada: McKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO

EXHIBITS, MEETINGS

(Continued from P. 15)

hibit, Oct. 5-7, Sherman Hotel, Chicago. Association headquarters, 1616 "K" St., N. W., Washington 6, D. C.

American Gas Assn.—Annual convention, Oct. 5-7, Chicago. Association headquarters, 420 Lexington Ave., New York.

Society of Automotive Engineers—National Aeronautic meeting, aircraft manufacturing forum and engineering display, Oct. 5-10, Ambassador Hotel, Los Angeles. Society headquarters, 485 Lexington Ave., New York 17, N. Y.

Gray Iron Founders' Society, Inc.—Annual meeting, Oct. 7-9, Fairmont Hotel, San Francisco, Calif. Society headquarters, 930 National City-E 6th Bldg., Cleveland.

American Society of Tool Engineers—Annual meeting, Oct. 8-10, Chase-Park Plaza Hotels, St. Louis. Society headquarters, 10700 Puritan Ave., Detroit 38, Mich.

Conveyor Equipment Manufacturers Assn.—Annual meeting, Oct. 10-13, Grand Hotel, Point Clear, Ala. Association headquarters, One Thomas Circle, Washington, D. C.

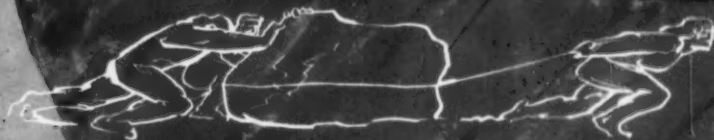
Farm Equipment Institute—Annual convention, Oct. 11-14, Queen Elizabeth Hotel, Montreal, Canada. Institute headquarters, 608 S. Dearborn St., Chicago.

American Society for Testing Materials—Pacific area national meeting, Oct. 11-16, Sheraton-Palace Hotel, San Francisco, Calif. Society headquarters, 1916 Race St., Philadelphia.

Wire Assn.—Annual convention, Oct. 12-15, Statler Hotel, Cleveland. Association headquarters, 453 Main St., Stamford, Conn.

Foundry Equipment Mfrs. Assn., Inc.—Annual meeting, Oct. 15-17, Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters, One Thomas Circle, Washington 5, D. C.

for every answer



...there was a problem

Often when you know where to look for the answer, the problem is half solved. Take the exciting, ever-broadening field of nondestructive testing. Here there are all kinds of answers, because there were — and are — all kinds of problems. In this field Magnaflux Corporation is often called "The House of Answers" — for problems like these:

If you are a materials engineer

You may want to know that the material you select for specific characteristics really has those characteristics when fabricated. Or, can you use a less expensive material safely? Can you be sure that your materials will be free of any defects that matter?

If you are a design engineer

You may want accurate stress and load analysis. You may also want to specify a positive way to test your pilot and production models.

If you are a manufacturing engineer

Your problem may be process control—not shooting for perfection, just reliable, consistent quality. You'll need a system fast enough to keep up with production and that fits into the rest of your set-up.

If you are a plant engineer

Your problem may be how to test for cracked parts during preventive maintenance—or in plant layout, how you can place the test equipment that will do the desired job most efficiently.

For these and many other nondestructive testing problems

MAGNAFLUX is often called

"THE HOUSE OF ANSWERS"

Magnaflux Corporation is a company devoting its entire effort to the systems and equipment for nondestructive testing used by more industries for more testing operations than all others combined.

The Magnaflux Field Engineers and the Engineering and Research staffs back of them have built their careers on finding the right answers to nondestructive testing problems. They are true specialists who take all factors into consideration in helping you find the test system that will solve your problem. Very often you will find the Magnaflux men already have or can develop the exact answer you are looking for, or they usually know who has the answer and will direct you to it.

The following three pages cover some of the major Magnaflux Test Systems and show why so many of today's nondestructive test problems can be solved by one or another of these systems.

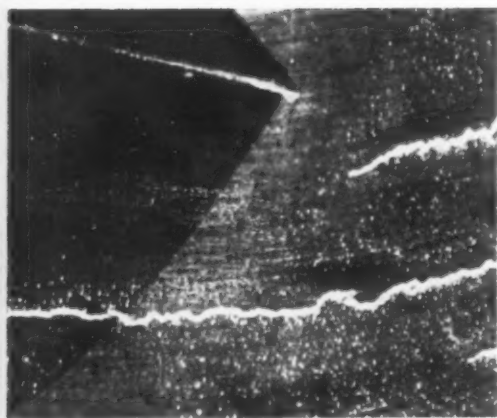


**MAGNAFLUX
CORPORATION**
Chicago 31, Illinois

the answer to your nondestructive testing

MAGNAFLUX and MAGNAGLO

most used test for magnetic metals



Inspection with Magnaglo shows otherwise invisible fatigue cracks in forged part.

By far the most common crackfinders used on magnetic metals for critical service, Magnaflux and Magnaglo use magnetic particles and controlled magnetic fields to find all cracks, inclusions or other defects at or close to the surface. Sensitivity is adjustable to find either defects as small as a few millionths of an inch or only the grosser ones.

Magnaflux and Magnaglo will find some types of defects that other tests will overlook. They mark defects right on the part. Magnaglo uses fluorescent materials and high intensity black light. Speed of testing is governed solely by production needs, on parts weighing from fractions of ounces to many tons. Fully automatic processing is often provided with the inspector merely "monitoring" parts as they pass through the machine. Cost per part tested is usually even less than for visual inspection alone, and many times more accurate.

ZYGLO® and ZYGLO-PENTREX®

most used test for nonmagnetic materials - fluorescent penetrant, black light.



Zyflo reveals and marks serious cracks in stainless steel part.

Zyflo and Zyflo-Pentrex use capillary forces to find cracks—or any other defects open to the surface—in such materials as aluminum, titanium, magnesium, plastics, glass and others. They may be used successfully on rough surfaces where ordinary visual inspection is hard or impossible. All defects are marked directly on the part. Recent improvements have increased maximum sensitivity beyond that of any other method in finding and defining certain defects. Near-absolute reliability is assured in leak tests. Adjustable sensitivity for any requirement prevents "over-inspection" and needless rejection. Engineered systems can be full automated.

At any test rate, cost is low; on volume production cost per piece is negligible.

problems may be here

MAGNATEST

Eddy current and magnetic measurement instruments evaluate properties of metals, detect variations, etc.

Magnatest instruments provide an almost magic evaluation of many properties within conductive materials by means of induced eddy currents or magnetic fields that "explore" the part or material.

New uses for Magnatest instruments are being discovered continuously, with no limit yet in sight. Some of the purposes for which these units are now supplying precise measurement or evaluation include:

- Measurement of electrical conductivity in absolute units (see illustration). Used to determine material alloy, hardness, heat treat uniformity . . . for sorting of mixed nonmagnetic metals, checking aging of aluminum alloys, detection of fire damage by measuring changes in conductivity, etc.

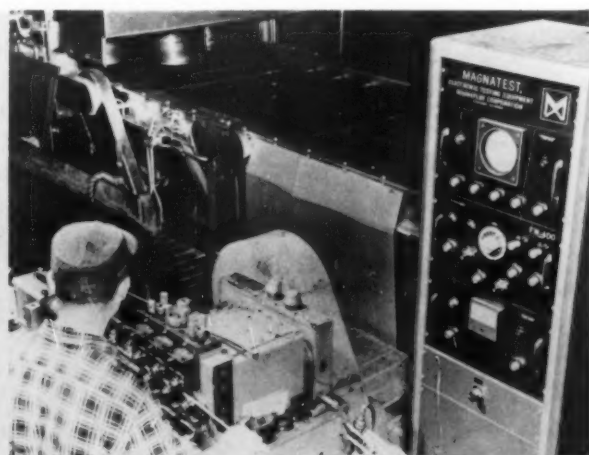


Magnatest FM-110 Transistorized Conductivity Meter, as used to sort copper billets according to conductivity, prior to machining.

(Photo courtesy Ampco Metal, Inc., Milwaukee)

- Testing nonmagnetic rod, tube and wire at mill speeds to detect laps, seams, inclusions, voids and other defects . . . with automation and recording if desired. (See illustration)
- Precision measurement of DC magnetic fields in geophysics, magnetic investigations, military uses and nondestructive testing of nonmagnetic metals and other related functions.
- Measurement of coercive force for steel property evaluation, for relay and transformer steel lamination stock, etc.
- Rapid, accurate determination of the moduli of elasticity, shear, Poisson's Ratio, and the damping factor of practically any solid materials.

Magnatest instruments for many other applications are also now in use in some of the fastest growing, broadest range fields of nondestructive testing. Magnaflux is the exclusive U.S. representative, using principles developed by Institute Dr. Foerster, Germany. More than 25 different Magnatest instruments are now available through Magnaflux Corporation.



Magnatest FW-400 Rod, Tube and Wire Testing Unit as set up for production inspection of copper tubing at mill speeds.

(Photo courtesy of Wolverine Tube Co., Detroit)

MAGNAFLUX CORPORATION



SONIZON®

Ultrasonic instruments use sound you cannot hear to measure thicknesses you cannot see—or to find hidden defects.

Sonizon SO-200 portable, direct-reading type instrument used here to measure pipe wall thickness.

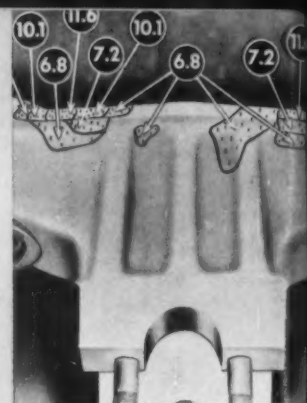


Sometimes called "a micrometer with only one arm", Magnaflux Sonizon measures thicknesses from one side as quickly as a crystal probe can be moved over the surface. Sonizon instantly detects thin (or corroded) spots in tank walls; in cast, formed, welded or ground shapes; it also reveals defects deep below the surface including laminations and lack of bond. Instruments are available in a unique portable direct reading type (see illustration) and the oscilloscope type.

STRESSCOAT®

Spray-on brittle coating saves time and cost. Gives overall stress analysis.

Stresscoat applied to prototype aluminum truck beam saddle shows operating stresses and concentration points.



Stresscoat determines stress concentration and measures values in simple or complex shapes, in static or dynamic testing. It predicts where parts would fail, so that they can be correctly designed not to fail in service. This makes possible better products that are lighter, stronger, less expensive to produce and less wasteful of material. Stresscoat is used at all stages—from laboratory tests, through pilot models to production units to be sure stresses remain within desired limits. With new ceramic Stresscoat, parts can be immersed in oil or tested at temperatures to 600° F.

SPOTCHECK®

low-cost, fire-safe dye penetrant in spray-on cans

On metal, plastic or other solid materials, Spotcheck provides a low-cost dependable test for medium to large, but still nonvisible, open-to-the-surface defects. Self-contained, pressurized spray cans offer the easy convenient means for handling and applying, or also in bulk. All materials are available in new nonflammable or high-flash formulas.



Spotcheck in-place test for aircraft landing wheel shows crack that is prelude to failure.

Your Testing Problem is "Different?"

—Tell Us About It

The applications, uses and answers possible with Magnaflux Test Systems have been barely touched upon in these pages. For lack of room, whole systems have been left out. For instance:

STATIFLUX® . . . electrified particle testing for fired ceramics, glass, porcelain enamel, plastics and other nonconductors . . . with constantly growing use in electronics and missile applications.

PARTEK® . . . filtered particle testing for ceramics and nonporous solids to reveal handling, forming and drying cracks in unfired clay bodies before kiln time is wasted on defective ones.

THERMOGRAPHIC TEST OF HONEYCOMBS . . . Bondcheck is a new fast test for proper bond and integrity in metallic honeycomb sandwiches and certain welded structures, widely useful in aircraft construction, among other applications.

INSPECTION SERVICE

In addition, Magnaflux Corporation maintains its own nationwide Commercial and Field Inspection Service, with plants in 16 principal cities, ready to test one part or one million, on a regular basis or to expand your own test capacity in emergencies.

No matter how unique or how routine your inspection problem, call in the Magnaflux nondestructive testing engineer. For thousands of companies, it has been one of the most profitable steps ever taken.



THE HALLMARK OF

Quality

IN NONDESTRUCTIVE TEST SYSTEMS

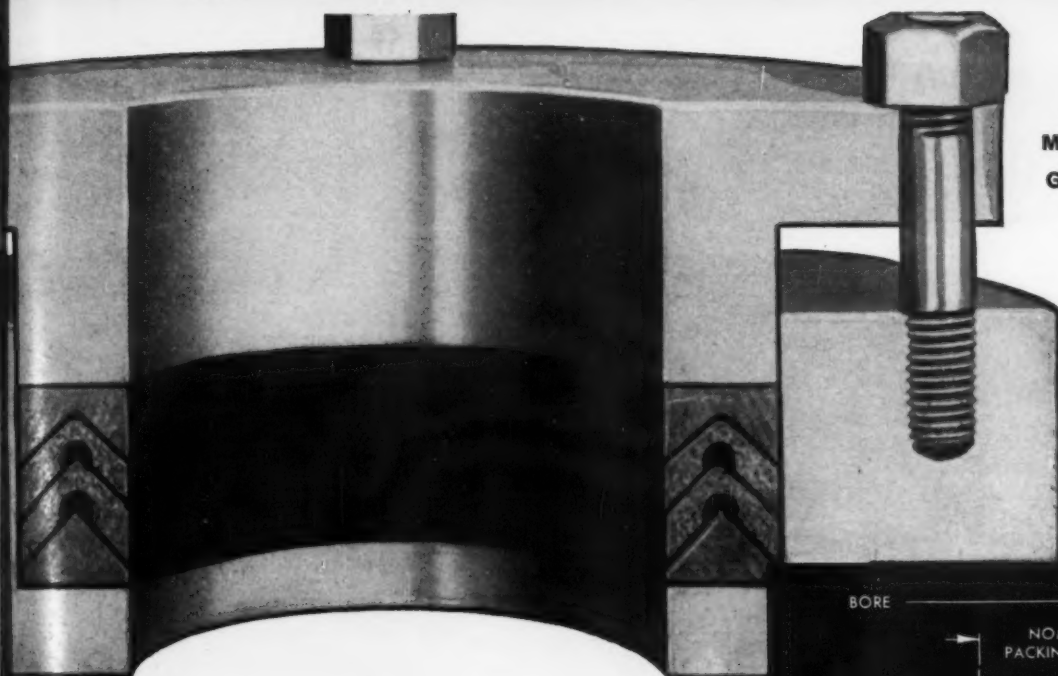
MAGNAFLUX CORPORATION

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New York 36 • Pittsburgh 36 • Cleveland 15

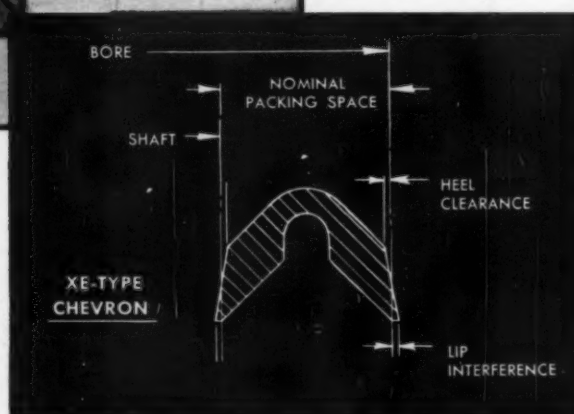
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**MORE ABOUT THE
GARLOCK 2,000**

HOW LIP INTERFERENCE AND HEEL CLEARANCE IMPROVE CHEVRON® PACKING DESIGN



There are many reasons why users prefer famous Garlock CHEVRON Packings for sealing rams or rods on hydraulic systems. Design refinements indicated in the drawing above are just two examples:

Heel clearance for easy installation. Experience has shown that unless adequate clearance is provided at the heel of a V-type packing ring it can be very difficult to insert in the stuffing box. The heel clearance on Garlock CHEVRON Rings has proved to be the ideal for easy installation without disturbing the unique advantages of the CHEVRON design.

Lip interference for sealing at low pressures. If the lip of a V-type packing is made exactly to nominal size, and all the clearance taken at the heel, leakage past the lip often occurs at low or zero pressures. On the other hand, too much interference

at the lip generates excessive friction resulting in scoring and wear. The lip interference on Garlock CHEVRON Packing is your assurance of minimum friction and positive sealing at all pressures.

There are many other design advantages of Garlock CHEVRON including its hinge-like construction which automatically compensates for pressure changes. If you have a sealing problem involving lubricants, liquids, or solvents at temperatures ranging from -320°F to $+600^{\circ}\text{F}$, why not find out more about the many forms of Garlock CHEVRON Packings available.

CHEVRON Packings are another important part of the Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals for all your needs. Call your local Garlock representative or write for Folder AD-115.

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.

For Prompt Service, contact one of our 26 sales offices and warehouses throughout the U. S. and Canada.

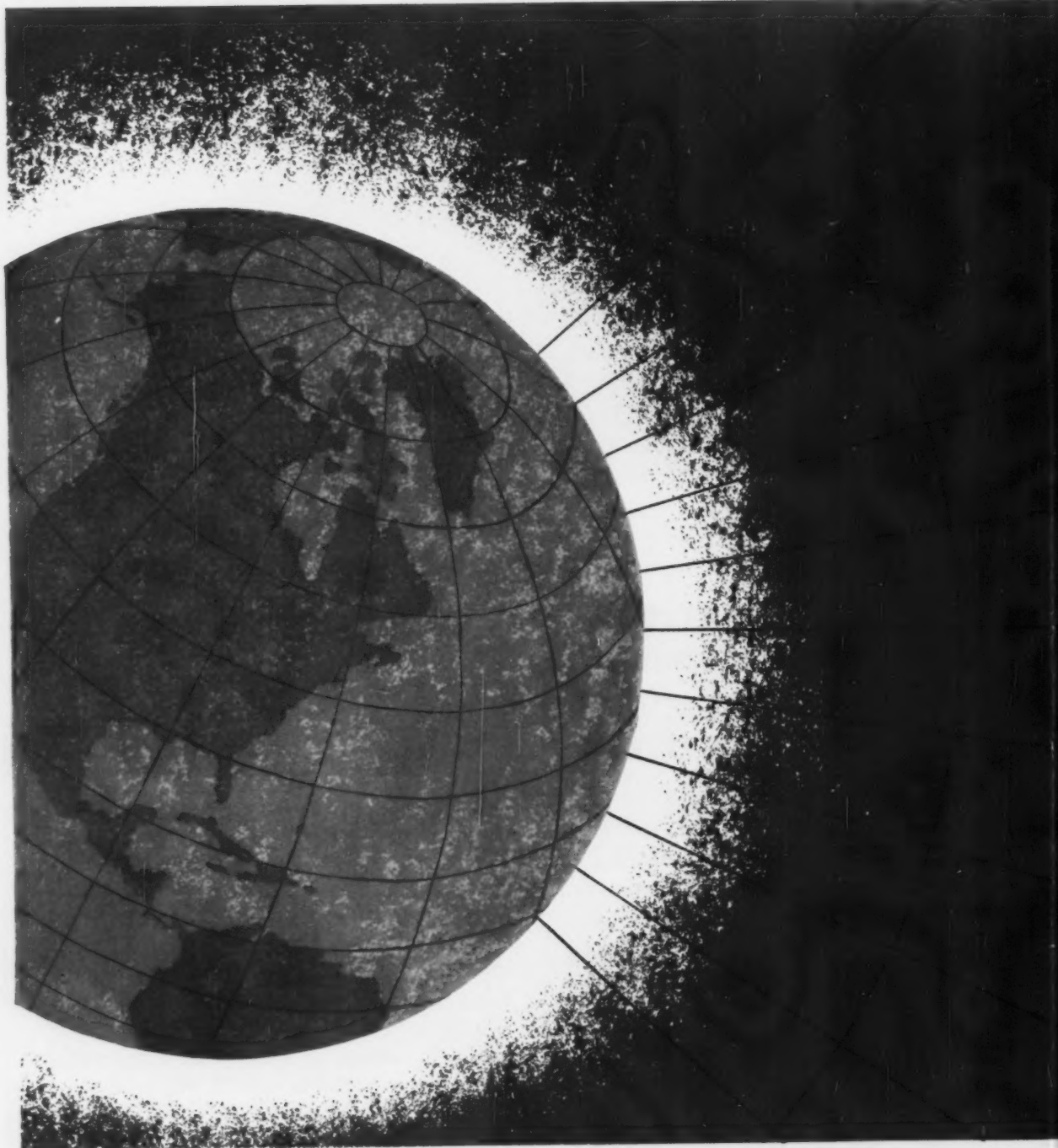
**Registered Trade Mark*

GARLOCK

*Packings, Gaskets, Oil Seals, Mechanical Seals,
Molded and Extruded Rubber, Plastic Products*



Canadian Division: The Garlock Packing Co. of Canada Ltd.
Plastics Division: United States Gasket Company



How can you make these products...more efficiently

You have observed the rapidly growing demand for oxygen and nitrogen in the steel and chemical industries (and in many defense applications). Now a sharp upward trend in the demand for Argon and Helium is apparent. American Messer has designed highly successful plants for the largest producers of oxygen, nitrogen, and argon in the United States. Special purpose plants are being built by Messer for pure carbon monoxide, liquid methane, and pure hydrogen production.

T H E R E I S N O S U B S T I T U T E

He

A

O₂

N₂

H₂

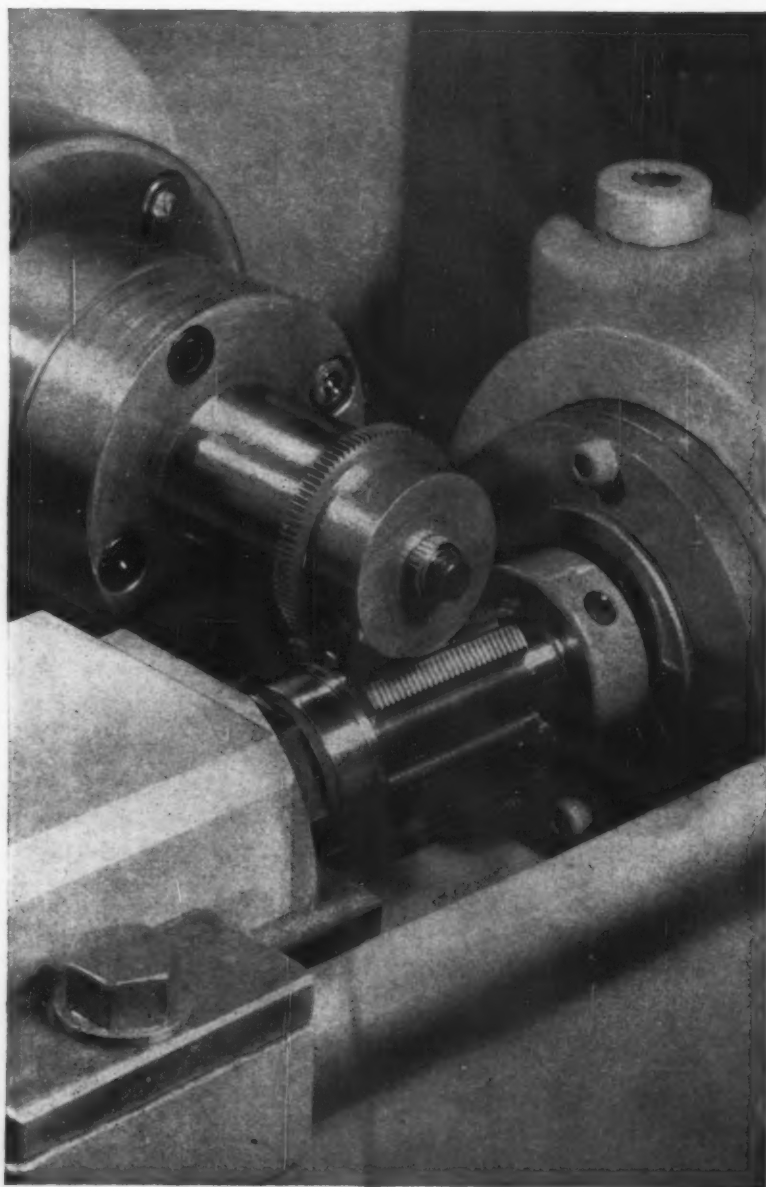


and more economically?

What are your requirements? If you are planning bulk Oxygen, Nitrogen, Argon, or Helium production or the liquefaction of Hydrogen, it will pay you to talk with American Messer. We will gladly give you a frank appraisal of how you may solve best and most economically your particular problem. Write: American Messer Corporation, 405 Lexington Avenue (Chrysler Building), New York 17, New York.

F O R M E S S E R E X P E R I E N C E ' ' '

New method of producing AGMA Precision



Selection and segregation no longer necessary to insure precision-matched spur gear sets

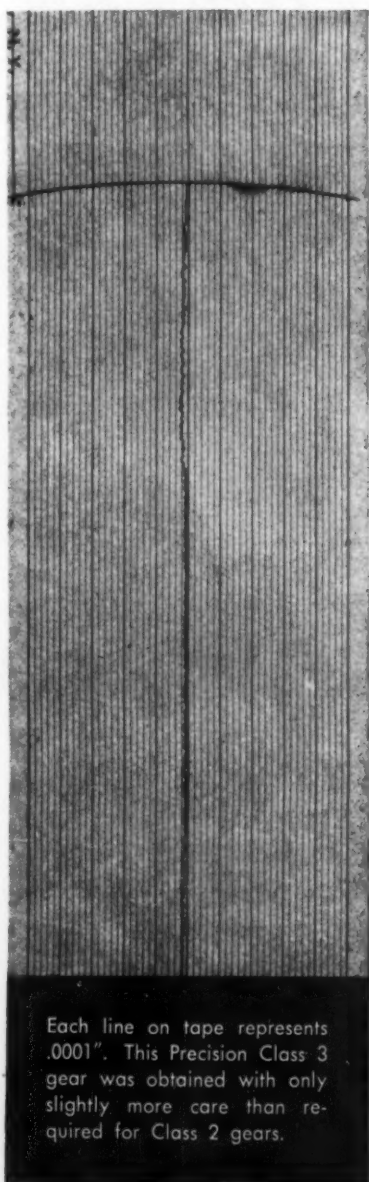
Selection and segregation—the process of producing more gears than you need in order to select a few that are within Precision Class 2 or Class 3 tolerances—is no longer necessary. And, these jobs at PIC Design Corporation, East Rockaway, L.I., New York, prove it.

In pioneering “Ultracision” accuracy for the missiles industry, Barber-Colman Company developed extensive machining and testing techniques now embodied in a new, low-cost hobbing machine—the No. 2½-4. For mass production of easily machinable parts which do not require such a high degree of accuracy, a high-speed version of this machine is available with a maximum hob speed of 2400 rpm.

Completely new hobbing machine

New concepts have been introduced into the Barber-Colman No. 2½-4 to bring you exceptional accuracy at a nominal cost. The No. 2½-4 is guaranteed to index accurately within 20 seconds of arc. This means that nonadjacent spacing error on a 2" dia. gear would be only .0001" due solely to the indexing error of the machine. When rigid tooling ... accurate blanks ... care in mounting the hob and work ... Class AA hobs ... and accurate hob-sharpening methods are used, it should be possible to hob AGMA Precision Class 2 and Class 3 gears without selection and segregation. Scrap and inspection time are reduced. And, in many

Class 3 Gears



Each line on tape represents .0001". This Precision Class 3 gear was obtained with only slightly more care than required for Class 2 gears.

cases, deeper savings can result from the elimination of finishing operations.

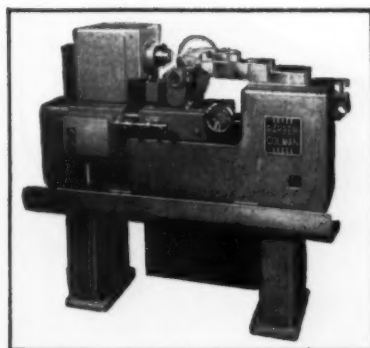
The accompanying PIC "true blue" gear tape shows the inspection record of a Precision Class 3 gear. On the production run, all gears had a total composite error of less than .0004". The gears have 96 teeth of 64 DP. The tape is made on a variable center-distance checking machine with a motor-driven master gear which rolls under preset pressure with the cut gear. After the work spindle adapter and the hob were trued within .0001", no further adjustments were necessary for hobbing gears of this accuracy.

The No. 2½-4 accommodates 3" dia. hobs, permitting maximum number of flutes for cutting accurate, smooth tooth profiles. Maximum work diameter is 2½" and length of cut is 2¼" — for steel gears as coarse as 30 pitch or brass up to 20 pitch.

PIC pursues accuracy in every corner of production

As you examine the results being achieved with the No. 2½-4 by PIC Design Corporation, you will see that in their pursuit of predictability and precision, no stone is left unturned.

Bores of Precision Class 2 and 3 gear blanks are machined to +.0002", -.0000" for size and roundness. Before turning, blanks are mounted on arbors the same size as the bores, with a .0002" taper. They are inspected for face wobble and must run true within .0002" per inch of diameter before the OD's are turned to a concentricity tolerance of .0001". This operation is checked at two points, 180 deg. apart.



In hobbing, the arbors are held in a floating adapter which permits fine adjustment to desired concentricity. PIC uses only Barber-Colman Class A or AA hobs, trued on the machine to less than .0001" runout.

Evaluate your gear processing and costs

If you have the problem of producing precision fine-pitch gears at a profit or want to improve your product by increasing gear accuracy, a Barber-Colman process analyst will help you evaluate methods, tooling, and cost improvements. Phone your B-C representative or the factory — WO 8-6833.

Barber-Colman Company



910 Loomis Street, Rockford, Illinois

MOST IMPORTANT NEWS

NOW YOU CAN USE 45° IDLERS

- **INCREASED CAPACITY**
- **LOWER INITIAL COST**
- **LOWER COSTS FOR MAINTENANCE**



**SAVINGS UP TO 20%
ON CONVEYOR COSTS...
12 to 60% GREATER
HAULING CAPACITY**

It's a mathematical certainty that a belt can haul bigger loads with 45° idlers than with regular 20° idlers. But the 45° angle between concentrating idlers and bottom roll idlers is too sharp for an ordinary heavy duty conveyor belt. Plies separate, but modern RAY-MAN CONVEYOR BELT licks this problem . . . for all time!

Ray-Man's exclusive flexible construction and built-in stress compensation is guaranteed to take the sharp angle of 45° idlers without ply or cover separation at the hinge line. This opens a whole new era of conveyor design . . . permitting larger loads . . . narrower conveyors . . . assuring longer cover wear . . . lower handling costs!

RAY-MAN GIVES YOU "MORE USE PER DOLLAR" WITH 45° IDLERS

IN CONVEYING TODAY!

...TO HANDLE **ALL** MATERIALS

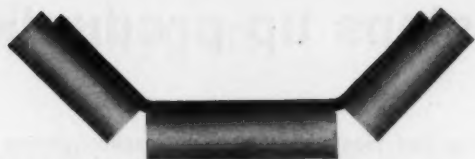


**BIGGER LOADS, LESS SPILLAGE, LESS WEAR
ON COVER WITH 45° IDLERS**



**20° IDLERS REQUIRE WIDER CONVEYOR
TO HAUL SAME TONNAGE**

Only **RAY-MAN CONVEYOR BELT**
is **BUILT** to take the
EXTRA STRESS OF 45° IDLERS



**RAY-MAN IS GUARANTEED NOT TO PLY-
SEPARATE AT 45° ANGLES**



**ORDINARY PLY BELTS ARE TOO BOARDY
TO TAKE 45° ANGLES**



Ask your R/M representative to show you how Ray-Man Conveyor Belt with 45° idlers can give you the most for your conveyor dollar ... write for new Bulletin M303, "Ray-Man for 45° Idlers."

RAYBESTOS-MANHATTAN, INC.
MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY



RM-001
**ENGINEERED
RUBBER
PRODUCTS
... MORE USE
PER DOLLAR**



Dann Goodson, Manager Motor-Driven Compressor Sales, The Cooper-Bessemer Corporation, explains...

How National Tube steps up production

Lorain Works of National Tube Division, United States Steel Corporation, is increasing ingot output by injection of oxygen into open hearth furnaces. Introduced by lances extending through the roof down into the furnace, the oxygen speeds up production. It is fed directly into the metal in a volume of 28,000 cu. ft. per hour per furnace.

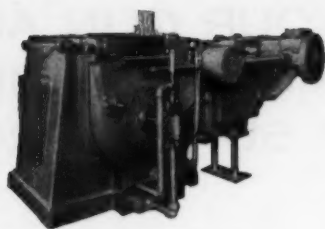
Another major use of oxygen at the Lorain Works

is for hot bloom scarfing. The machine shown here removes seams and other defects, conditions blooms for rolling into top quality products. Entire operation is automatic, push-button controlled.

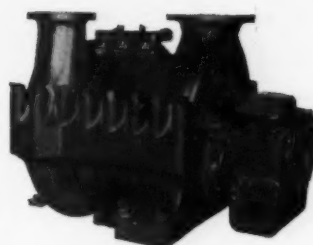
The 2000 hp Cooper-Bessemer Type JM Air Compressor, shown here, plays an important part in the manufacture of the oxygen used for these and other operations at the Lorain Works. This is a 4-stage unit,

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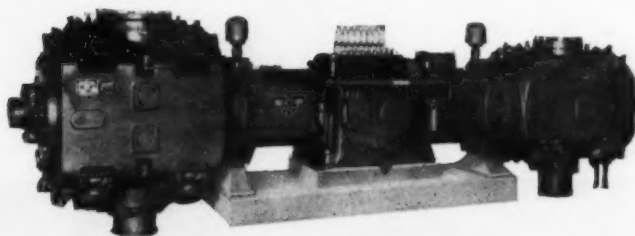


EXPANSION ENGINES



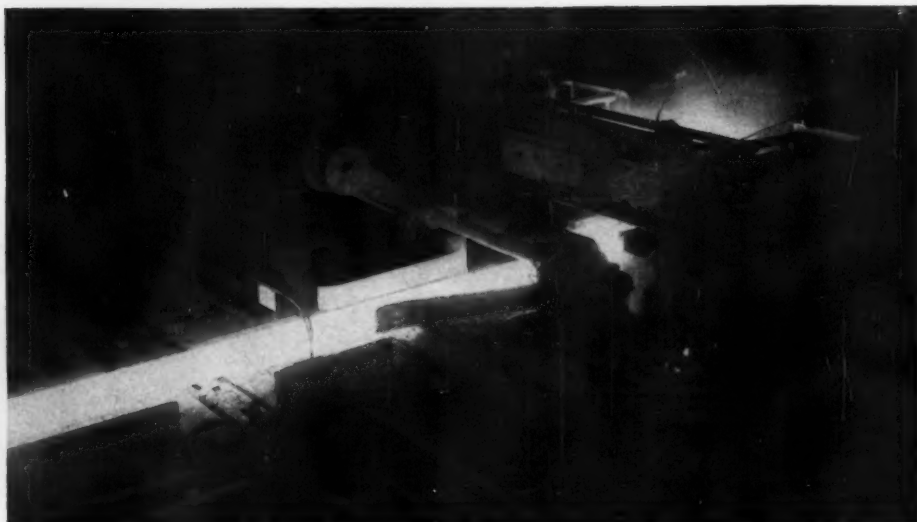
CENTRIFUGAL COMPRESSORS

Cooper-Bessemer products for oxygen production include reciprocating and centrifugal compressors, expansion engines and En-Tronic controls.



RECIPROCATING COMPRESSORS

Hot scarfing machine at Lorain Works steps up descaling speed, boosts uniformity of this conditioning process.



with oxygen

operating at 300 rpm with a discharge pressure of 1000 lbs. The plant was designed and built by American Messer Corporation.

Cooper-Bessemer can supply all types and sizes of reciprocating or centrifugal compressors, expansion engines and En-Tronic® controls for oxygen production. Call our nearest office for engineering service when you start to plan your facilities.

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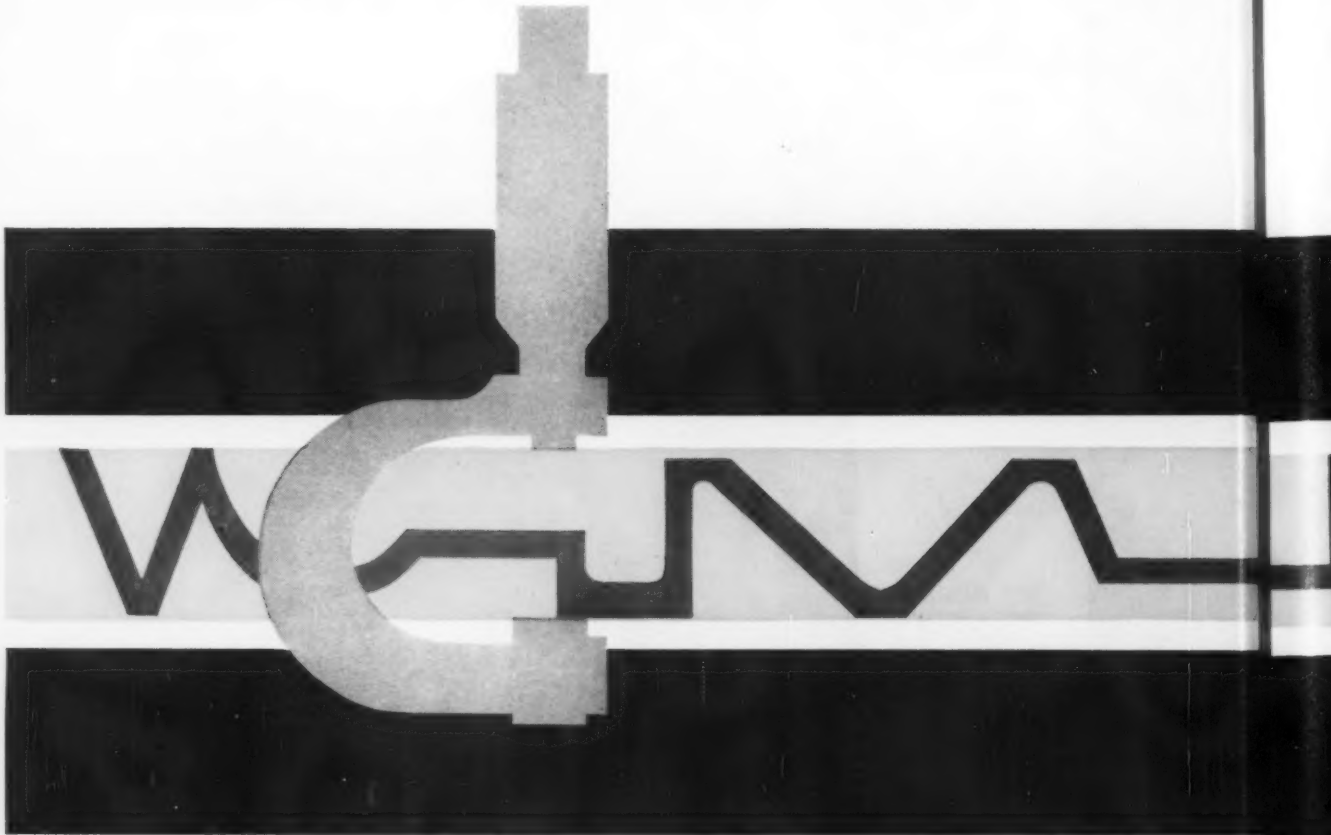
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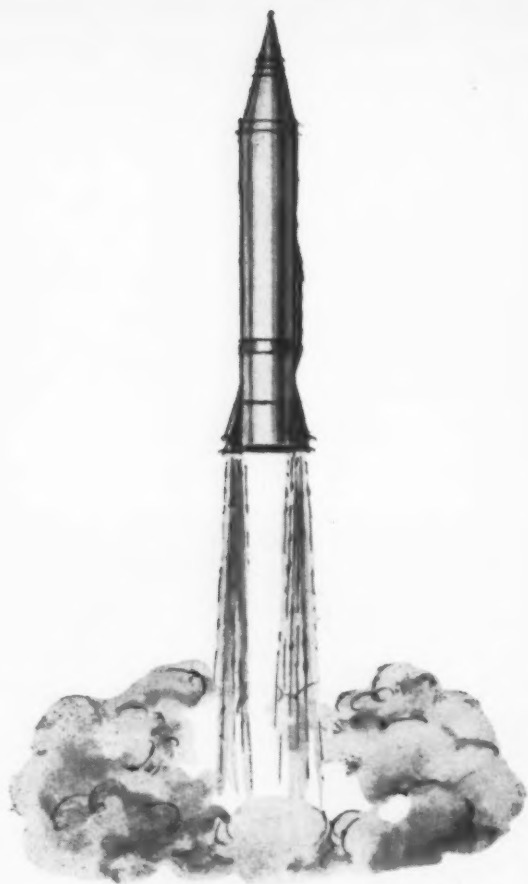
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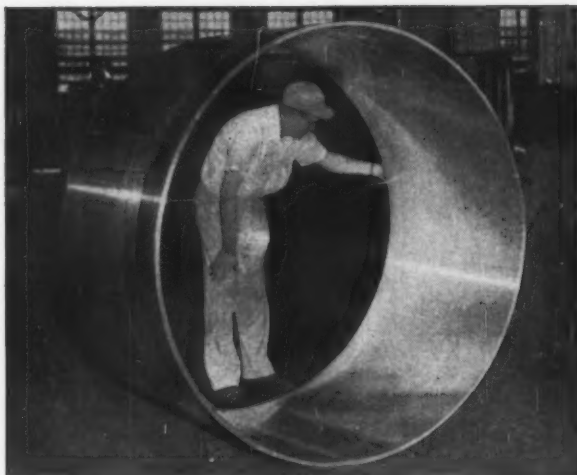
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QUALITY OF "MINUTEMAN" MISSILES PARTS DETERMINED BY STANDARD STEEL WORKS RESEARCH

Months of research and development of various rigid quality-control procedures at Standard Steel Works Metallurgical Laboratories preceded the delivery of "Minuteman" missiles parts of extremely high-quality material.

Standard Steel Works' laboratory facilities—second to none in industry—make possible delivery of unusual forgings from special steel alloys in record time. Missiles parts of the highest cleanliness ratings have been furnished from both air and vacuum melted steel. All are subjected to ultrasonic inspection under water for defects and to microscopic examination for cleanliness.



First stage motor case ring—vacuum-melted D6A steel



Second stage motor case ring—vacuum-melted 300M steel



Third stage motor case ring—air-melted AMS-256 steel

Standard Steel Works Division

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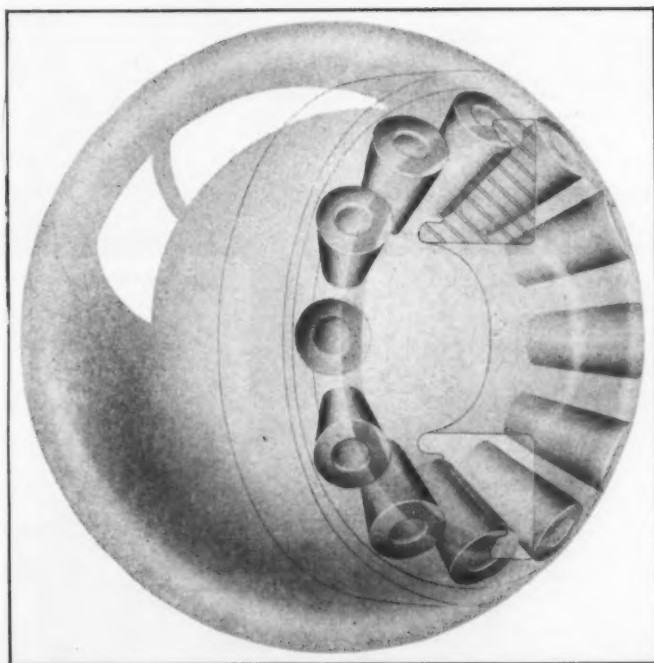
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Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes





SPHERICITY — ESSENTIAL TO MAXIMUM BEARING PERFORMANCE



For a tapered roller bearing to achieve maximum performance, i.e., maximum life and capacity under load, it must have true sphericity — a condition of bearing geometry which permits true rolling of the tapered rollers in the raceway.

True rolling in tapered bearing elements is the result of maintaining a critical geometric relationship between the raceways and the contact surfaces of each roller. True rolling is essential to maximum performance. Without it, premature bearing failure is certain.

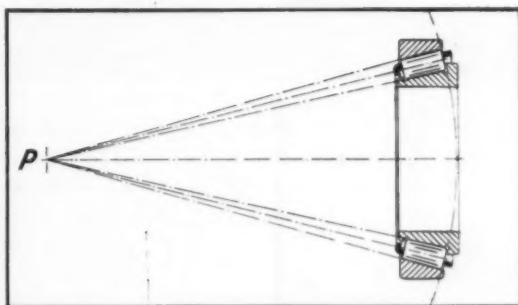
As engineers know, a tapered roller will describe a true circle when rolled on a plane surface. It will always roll in this one path precisely, without sliding or skewing. But to put true rolling to work in a bearing which can carry both heavy thrust and radial loads, it is essential that the rollers and the raceway have a true

spherical radius, or sphericity. The drawing illustrates this condition.

If each roller in the bearing were to be extended in length, while retaining its taper, it would form a cone, terminating at point "P". All cones generated from all rollers would meet at point "P", which is also the center of the hypothetical sphere shown. The surface of the sphere would touch all points on each roller's head!

In effect, then, each roller's taper determines the radius of a hypothetical sphere

When you require bearings, we suggest you consider the advantages of Bower bearings. Where product design calls for tapered or cylindrical roller bearings or journal roller assemblies, Bower can provide them in a full range of types and sizes. Bower engineers are always available, should you desire assistance or advice on bearing applications.

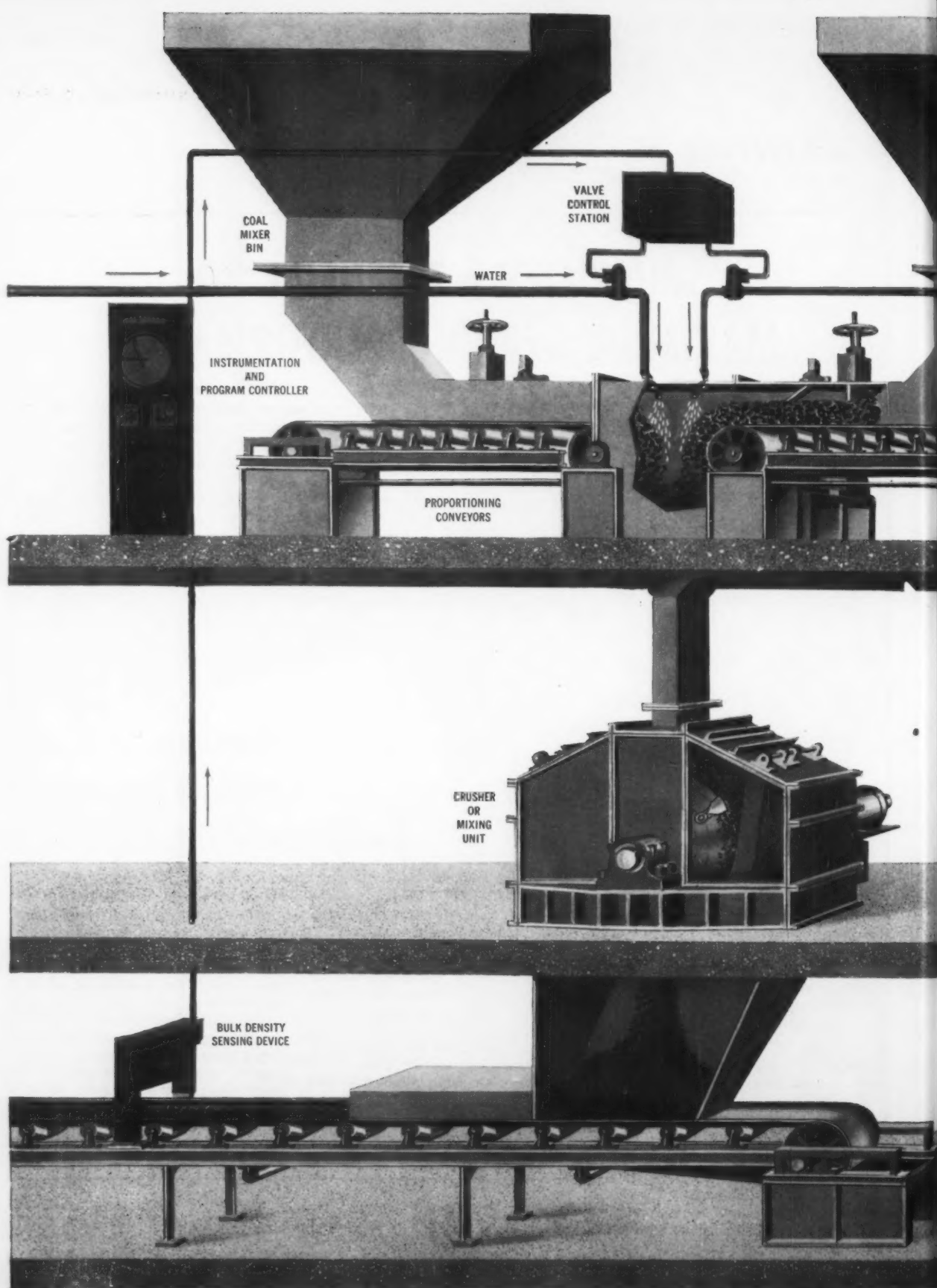


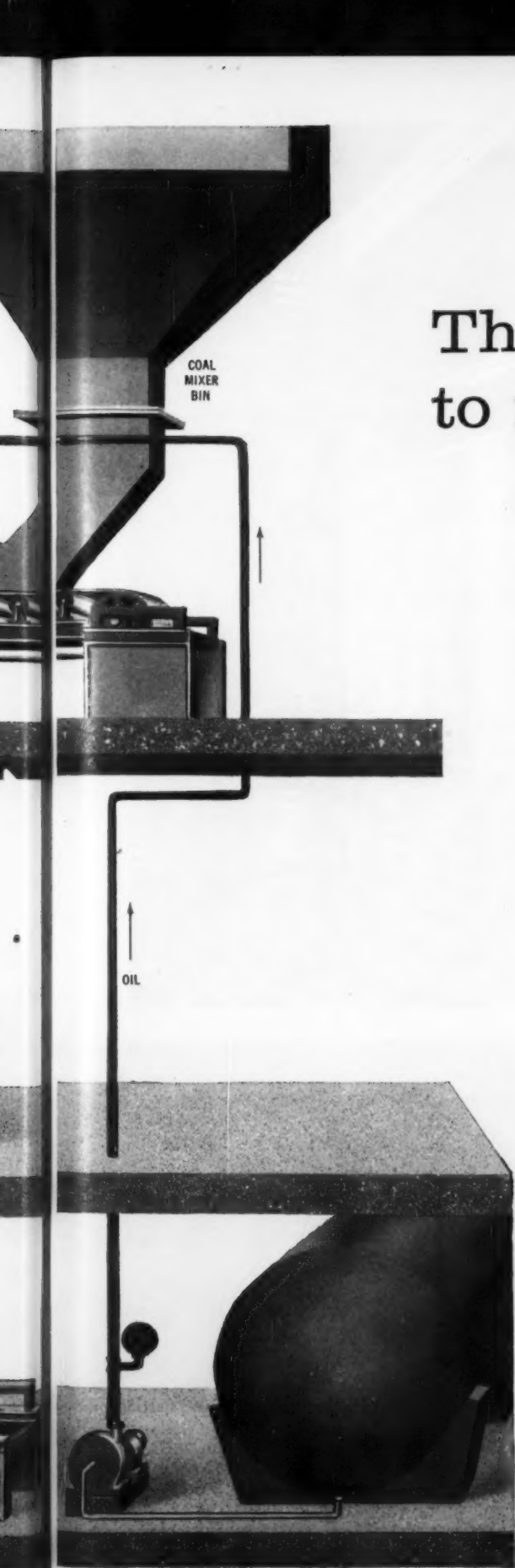
True rolling of tapered bearing elements depends upon maintaining a true spherical radius during manufacture.

whose surface, in turn, determines the correct contour for each roller head. Only when these conditions are satisfied in design, and when they are rigidly held during manufacture, will true rolling take place. In the manufacture of each Bower tapered roller bearing, sphericity is held within extremely narrow limits by means of special Bower-designed precision grinders. The consistent accuracy possible with these machines is one major reason why Bower roller bearings provide maximum performance under all speeds and loads up to the bearing's maximum rating.

BOWER ROLLER BEARINGS

BOWER ROLLER BEARING DIVISION — FEDERAL-MOGUL-BOWER BEARINGS, INC., DETROIT 14, MICHIGAN





The weigh to make coke better

Koppers automatic bulk density control of coking coal

Coke ovens operate most efficiently when the coal mix is kept at a uniform, optimum density. If bulk density is too high, oven walls may be damaged by the extreme pressure of expansion during the coking cycle. If the density is too low, coke production will be less than oven capacity.

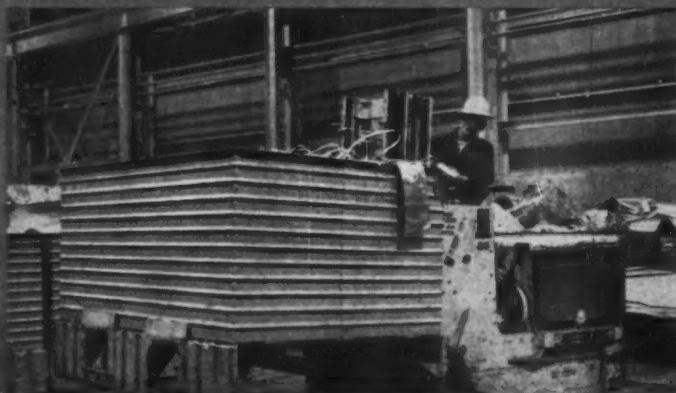
For accurate control, the coal has to be weighed and then bolstered with oil to raise the density, or watered to lower it. The usual hand control can be a slow and costly operation, and just doesn't do the job. But Koppers has developed *automatic* bulk density control equipment. A sensing device measures bulk density as the coal conveyor moves past the mixing unit. The measurement is relayed to a control center which then regulates the addition of water or oil to the coal flow.

Bulk density control achieves consistent coke quality, and increases coke production.

Koppers Company has been assigned U. S. Patent Numbers 2,378,420; 2,510,158; 2,765,266; and 2,864,537 which cover equipment for bulk density control. If you would like to have more information about the Koppers control systems, or if you would like information regarding use of bulk density equipment under Koppers patents, please write to Koppers Company, Inc., Engineering and Construction Division, Koppers Building, Pittsburgh 19, Pennsylvania.



KOPPERS
ENGINEERING AND
CONSTRUCTION



REPUBLIC STEEL BOX AND SKID UNITS are performing double duty at Kaiser Aluminum & Chemical Corporation's new Ravenswood, West Virginia Works. Designed for 8000 lb. load capacity, these units were built by Republic's Berger Division. Talk over your handling-storage problems with a Republic Specialist. Call your nearest Republic representative or write direct today.



REPUBLIC'S BERGER DIVISION CONTRACT FACILITIES can help solve your fabricating and assembly problems. Take worry out of your production problems. Write today, let a Republic representative review Republic's facilities with you.

mark of a good place to work... REPUBLIC STEEL LOCKERS

It's so easy to improve employee relations with clean, attractive dress-wash-and-change facilities planned around Republic Steel Lockers.

Republic Steel Lockers offer industrial management decided advantages in service and economy. Big and roomy . . . interiors are spacious, well-designed for convenience and good ventilation. Strong and sturdy . . . made of steel to assure complete protection of personal effects and tools. Heavy-duty hooks and hardware are the best obtainable.

Republic Steel Lockers are *Bond-erized*. This exclusive Republic feature provides a superior base for the baked enamel finish. Offers protection against rust and corrosion . . . restricts bumps, scratches, abrasions of everyday service to the site of the injury. And reduces maintenance costs to a minimum.

Republic Steel Lockers are available with any of the popular locking devices including the new fully chrome-plated foolproof Locker Handle that operates with fingertip control. Padlocks cannot be hung through loop handles without locking the locker. Handle is attached with a tamper-free Gulmite screw and lockwasher. No need to worry about pilferage.

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Help your employees start their day and end their day with a good feeling about your company. Get the best locker facilities at the lowest possible cost—specify Republic Steel Lockers.

CALL YOUR REPUBLIC REPRESENTATIVE, OR WRITE...



REPUBLIC WEDGE-LOCK LONG PARTS STORAGE UNITS are easy to load and unload from either side. The heavier the load, the tighter the grip because Wedge-Lock construction includes the three prime essentials of good shelving: 1. a post that will not bend, 2. a reinforced shelf that does not sag, and 3. a concealed sway-proof joint. Republic's Berger Division offers a complete line of shelving, storage units, and shop equipment to meet your needs. Republic Engineering Specialists help you plan. Write today.

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Please send information on the following Republic products:
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Cellulubes by Celanese shoulder the big jobs . . .

CELANESE CORPORATION OF AMERICA, CHEMICAL DIVISION
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Application I have in mind _____

In standard tests, Cellulubes were dripped and flooded onto molten metal at 1500° F without igniting! In a standard flammability test, Cellulubes were sprayed under pressure onto burning oil-soaked cotton waste; they actually extinguished the fire on a portion of the flaming material!

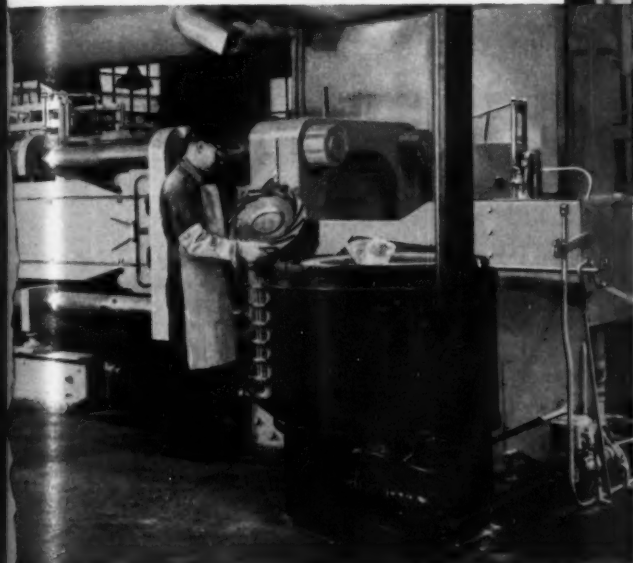
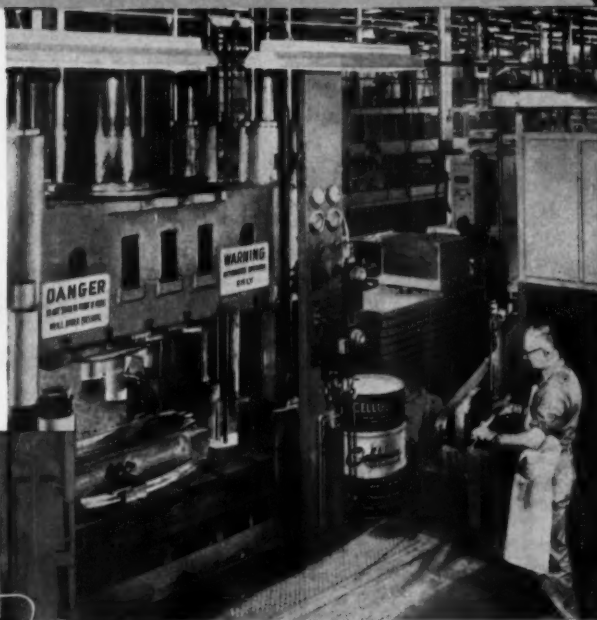
No wonder Cellulubes made by the Celanese Corporation of America are specified for big jobs in hydraulics which present potential fire hazards.



Factory Mutual-Approved
(Cellulubes 150 and 220)

U.S.S. INDEPENDENCE, the Navy's newest 60,000-ton supercarrier, takes on 55-gallon drums of Cellulube, part of a six-car trainload. Used to operate giant aircraft elevators, Cellulubes overcome the hazard of fire and explosion. Cellulubes are used in the combat fleet for fire-safe hydraulic duty.

TITANIUM PARTS expanded by heating to 1000°F are transferred from an electric furnace to a powerful hydraulic press. North American Aviation uses fire-resistant Cellulube 220 to protect against the dangers of line fracture or leakage during this form-die quenching operation for making high-strength aircraft parts.



DIE-CASTING MACHINES at Alcoa's Garwood plant are hydraulically actuated. Furnace in foreground shows the proximity of the lines to the molten metal. Lines operate at pressures up to 3500 psi. Cellulube hydraulic fluids minimize the danger of fire.

reduce fire hazards near hydraulic machines

Wherever hydraulic lines pass near a source of ignition, fire-resistant Cellulubes are a must.

The fluids are available in six ranges of viscosity, and they maintain these viscosities under the severest conditions of mechanical shear. Cellulubes display excellent physical and chemical stability. They do not foam, cannot drop additives into the system. In fact, they actually have a cleansing action in machinery. Low compressibility insures efficient power transfer. The good lubricant properties of Cellulubes safeguard equipment life and

decrease maintenance.

Let us help you with your hydraulic problems wherever a hazard might exist. Celanese, pioneer in fire-resistant functional fluids, can draw on long field experience and research background in solving your problem. For full technical specifications, send for the "Cellulube Safety Series" manual. If you'd like a sample of Cellulube, please let us know what application you have in mind.

Celanese Corporation of America, Chemical Division, 180 Madison Ave., New York 16, N. Y.

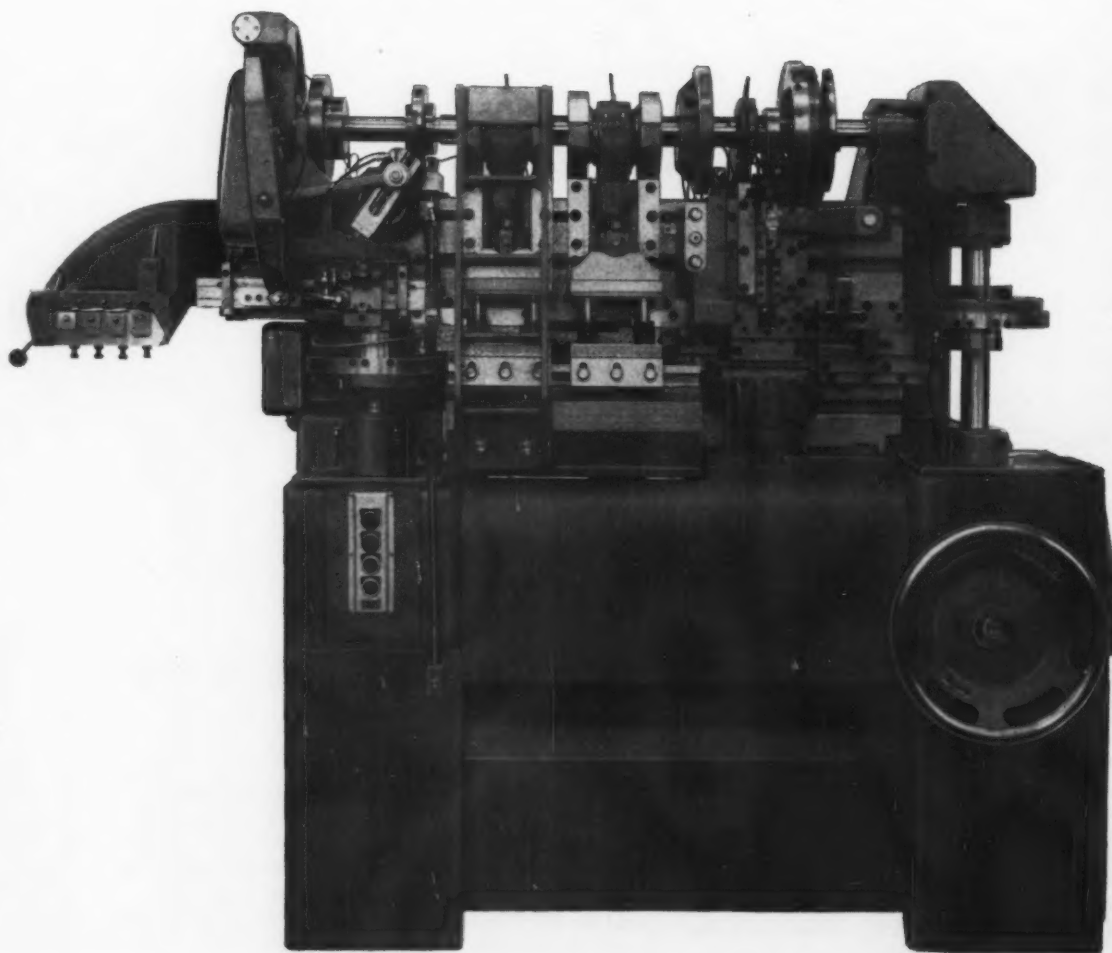
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Cellulubes...  fire-resistant functional fluids

In Canada: Canadian Chemical Company Limited, 2035 Guy St., Montreal, Toronto, Vancouver • Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16

CELANESE CELLULUBES

ON ITS
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JOB THIS
REVOLUTIONARY
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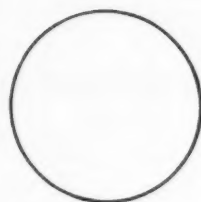
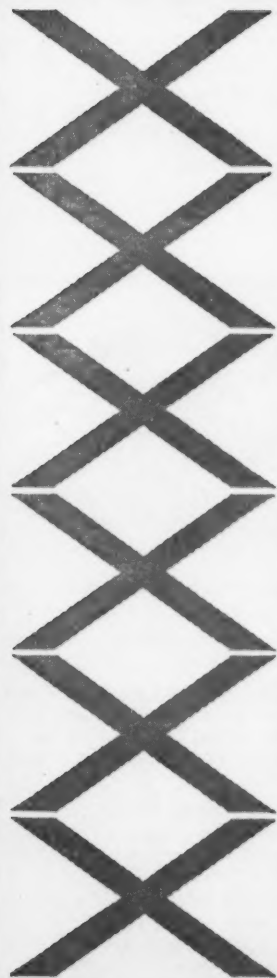
It's the sensational Torrington **Verti-Slide**, a most important new production tool. This amazing new vertical four-slide machine promises a genuine revolution in the **high-speed, high-precision, low-cost production** of just about everything in strip or wire that is now being produced on progressively tooled forming presses or conventional four-slide machines. Write or call today for complete technical data—or a Torrington sales engineer.

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"MADE BETTER TO SERVE BETTER"

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1/4" to 1" sizes for pressures up to 5000 p.s.i. Approved by U.L., A.G.A., A.S.M.E., A.S.A. and S.A.E.

S.A.E. 45° Flare Compression Selfalign® Threaded Sleeve Inverted Flare Pipe



forged steel FITTINGS

For flare and flareless pressure connections. Sizes 1/4" to 2" in carbon or stainless steel for pressures to 10,000 p.s.i.

Ermeto Flare-Twin S.A.E. 37° Flare Pipe



bulk hose

Twenty different styles available. From 1/4" to 2" O.D. for working pressures up to 10,000 p.s.i.



hose assemblies

Completely fabricated with permanently attached swaged ends. Any size, any quantity for working pressures up to 10,000 p.s.i.



reusable hose ends

Designed for fast assembly and positive, leak-proof performance under high pressures.



tube working tools

Designed for fast, accurate fabrication of all types of tubing layouts.

Tube Cutters
Tube Bending Springs
Mechanical Benders
Flaring Tools
Swaging Tools



Write for new general catalog—contains complete data and specifications for all items.

Screw machine parts made to your specifications... any machinable material. Write for information.

AWARD WINNING IDEAS...

Service Minded Equipment Company Uses Ermeto Fittings on Self-Supporting Hydraulic System for "Jeep-A-Trench"



Trenching operations subject digging ladders to varying shock loads. The "Jeep-A-Trench" is equipped with a hydraulic lift which cushions these loads to reduce service and maintenance requirements in the shop and in the field.

Idea submitted by:
Mr. WARREN E. GEORGE
Auburn Machine Works, Inc.
Auburn, Nebraska

In developing the "Jeep-A-Trench", Auburn's engineers considered two important factors: digging in all types of soils subjects any trencher to varying shock loads; and, their equipment must operate in any terrain under all types of conditions. For these reasons, they perfected a hydraulic lift for the digging arm of the "Jeep-A-Trench" that would be as nearly service-free as possible.

"We used steel tubing on our hydraulic system because it withstands greater stresses, does not require the maintenance of rubber covered flexible tubing and it

is self-supporting. It is simpler to service," explained Mr. George.

"ERMETO hydraulic fittings were selected because Weatherhead had technical service facilities available all over the U. S. to help service the equipment in case of difficulties."

Auburn is but one of the many service-minded companies relying on Weatherhead fittings for service and reliability. If you desire information or assistance in simplifying your tubing and fittings applications, write today.



ERMETO flareless hydraulic fittings are unmatched for dependability and high pressure control. Available in stainless or carbon steel with "Weathercote" finish. Standard sizes: 1/4" to 2", for pressures up to 10,000 p.s.i.

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Chemical energy provides direct current

Power is furnished by a fuel cell in the Allis-Chalmers Research Laboratories. It points the way to remarkably efficient means of energy conversion in the future.

Unlike the conventional storage battery, the fuel cell converts the chemical energy of gases (at room temperature) directly into direct current. For the future the fuel cell promises a highly efficient source of power.

Fundamental research of this type serves *two* end results at Allis-Chalmers: 1) enables design engineers to make equipment even better; 2) helps every industry achieve new efficiencies and economies.

Research is only one area where A-C helps. Single-source availability of "teamed" equipment, maximum engineering assistance and outstanding service facilities are others. For more information, contact your A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin.



Products for Industry Electrical Generation, Distribution and Utilization Equipment; Pumps; Compressors; Mechanical Power Transmission Equipment; Processing Machinery; Motors and Control; Water Conditioning Systems, plus Materials Handling Equipment.



A-1010-G1

ALLIS-CHALMERS

Fuel Cell, being researched by Allis-Chalmers, converts chemical energy of hydrogen, oxygen or other gases into direct current. It operates with minimum maintenance and is unaffected by temperatures.



Talide® Rolls Best for Rolling Ultra-Thin Strip!



Hamilton Watch Company, Lancaster, Pa., leading manufacturer of fine watches and precision instruments, reports superior results obtained using Talide rolls on their ZR-32 4" Sendzimir mill.

Using Talide rolls, only 1/3 the normal number of passes is required to reduce thickness of ferrous and non-ferrous strip to .000100".

In addition to outwearing steel rolls 4 to 1, grinding costs are reduced and an improved surface finish is imparted to the strip.

Further, less surface contamination results when using Talide rolls for rolling certain types of alloy strip used for electrical applications.

Talide rolls have proven far superior to both steel rolls and carbide rolls of any other make. They are ultra-hard, extremely dense and porous-free. Strip steel of all analyses can be rolled down to thinner gauge, with more accuracy, greater reductions and with fewer anneals than possible with any other roll.

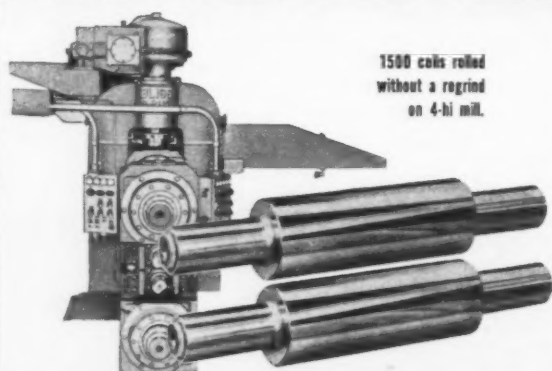
During the last six years Talide rolls have been adopted by every major strip steel producer. Metal Carbides pioneered and developed tungsten carbide rolls and successfully adapted them to all types of rolling mills including STECKEL, BLISS, UNITED, MESTA, STANAT, SENDZIMIR, WATERBURY-FARREL, TORRINGTON, RUESCH, FENN, WEAN, COLD METAL, etc.

ONLY TALIDE WORK ROLLS GUARANTEE THESE ADVANTAGES

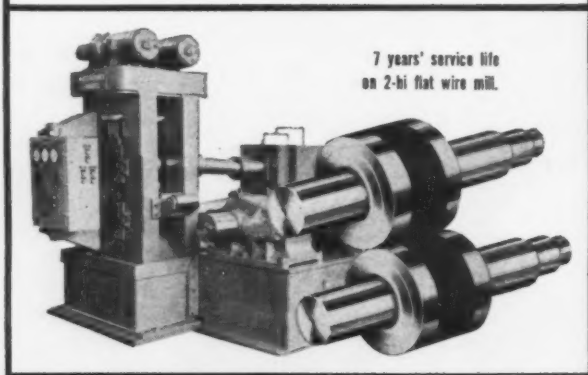
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|--------------------|----------------------|
| ★ MORE PRODUCTION | ★ IMPROVED PHYSICALS |
| ★ BETTER FINISH | ★ GREATER REDUCTION |
| ★ LONGER LIFE | ★ LESS DOWN TIME |
| ★ HIGHER SPEEDS | ★ FEWER REJECTS |
| ★ CLOSER TOLERANCE | ★ LESS MAINTENANCE |

SUPERSET GRINDING WHEEL

The Superset diamond grinding wheel was specially developed for grinding carbide rolls to highest possible surface finish and luster. Made of 4-8 micron size diamond dust, it imparts a surface finish far superior to any other commercial wheel. Available in sizes up to 25" diameter.

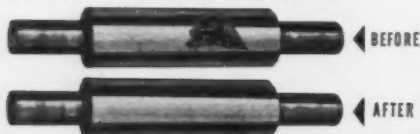


1500 coils rolled
without a regrind
on 4-hi mill.



7 years' service life
on 2-hi flat wire mill.

EXCLUSIVE REPAIR SERVICE

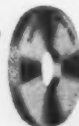


Broken or damaged carbide rolls can be re-worked to first class condition with all defects eliminated at one-half original cost. Only Metal Carbides offers this service—because of its exclusive hot press method.

Talide Rolls are made in lengths up to 100", diameters up to 25", and up to 5000 lbs. by weight.

METAL CARBIDES CORPORATION
Youngstown 12, Ohio

Send for new 76-page catalog 56-G



HOT PRESSED AND SINTERED CARBIDES • VACUUM METALS
HEAVY METAL • ALUMINUM OXIDE • HI-TEMP. ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

2-year acid test! Open motor

In a tough acid pump installation, Dow Chemical's Texas Division experienced no end of motor troubles. It seemed nothing could stand up in that humid, corrosive atmosphere. Reports Dow: "Even with totally enclosed motors, winding failures were frequent." And, they might have added, expensive.

Then came Super-Seal motors — Allis-Chalmers open-type motors with amazing *Poxeal* insulation. A durable case of epoxy-resin encloses the winding end turns and slot portions of the stator... the most complete protection ever developed. Result? The *Super-Seal* motor, after two years of continuous operation in the acid area, is as good as ever. So good, in fact, that Dow has ordered 150 *Super-Seal* motors for a new chemical plant at Freeport, Texas.

Isn't it time to reevaluate your motor standards? There's a good chance that costly enclosed motors are no longer needed. Contact your A-C representative or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

Super-Seal and Poxeal are Allis-Chalmers trademarks.

ALLIS-CHALMERS

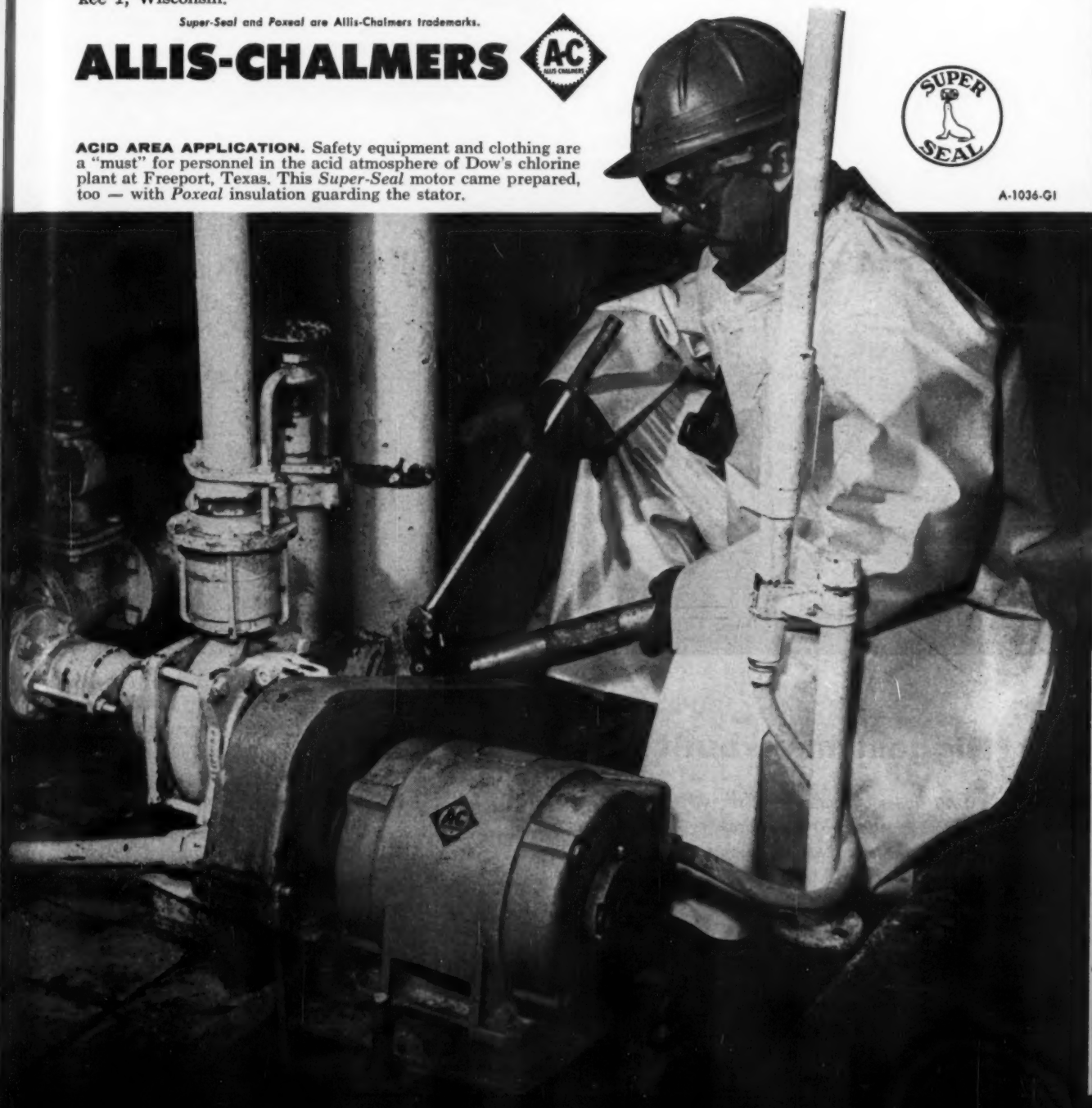


ACID AREA APPLICATION. Safety equipment and clothing are a "must" for personnel in the acid atmosphere of Dow's chlorine plant at Freeport, Texas. This *Super-Seal* motor came prepared, too — with *Poxeal* insulation guarding the stator.



A-1036-G1

beats
enclosed
type at
its own
game





Biggest man-built island

SEVEN miles off the coast of Louisiana, reaching 220 feet below and rising 60 feet above the Gulf of Mexico, is a massive steel island. It's the world's first offshore sulphur mining plant.

This mine is a project of the Freeport Sulphur Company, and is scheduled to open in 1960. Known as the *Grand Isle*, it will be one of the world's largest sulphur mining operations. The Frasch process will be used. Every day, 5 million gallons of sea water, heated to 325°F., will be injected into the underground sulphur deposit. Hot water melts it. Compressed air will force the liquid sulphur to the surface.

The Gulf of Mexico brews black storms. Vicious storms. But this mile-long structure is built to take the brutal pun-



ishment of the sea. From end-to-end, it's braced with tons of heavy-wall pipe from National Tube.

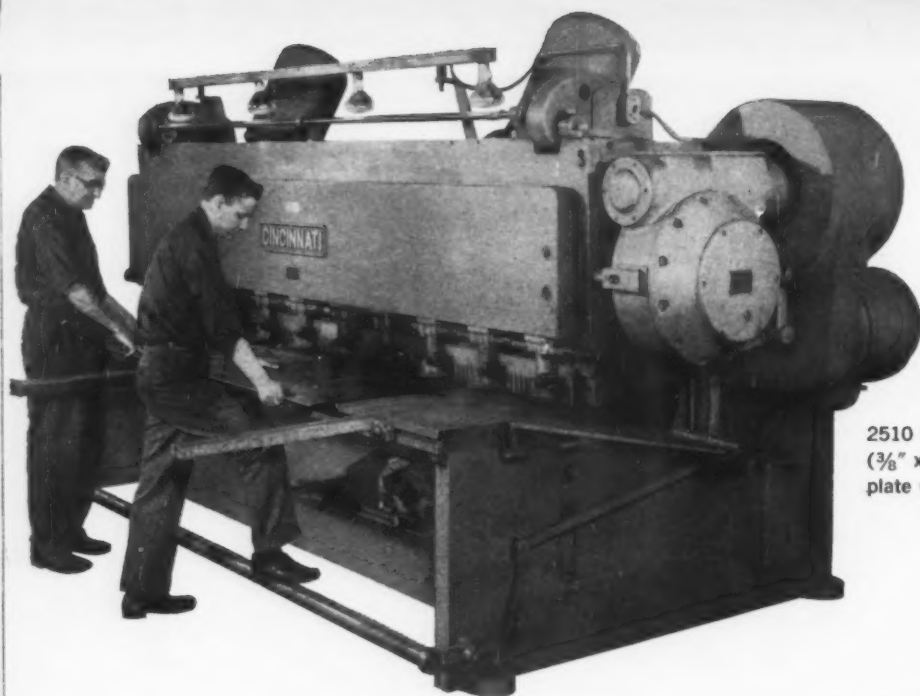
National Tube is also supplying casing, line pipe and standard pipe for the completion of this project. For more than 80 years, National Tube has handled tough tubular installations in the fields of line pipe, marine piping, mechanical tubing and oil country tubular products. Write us for assistance. National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS and National are registered trademarks



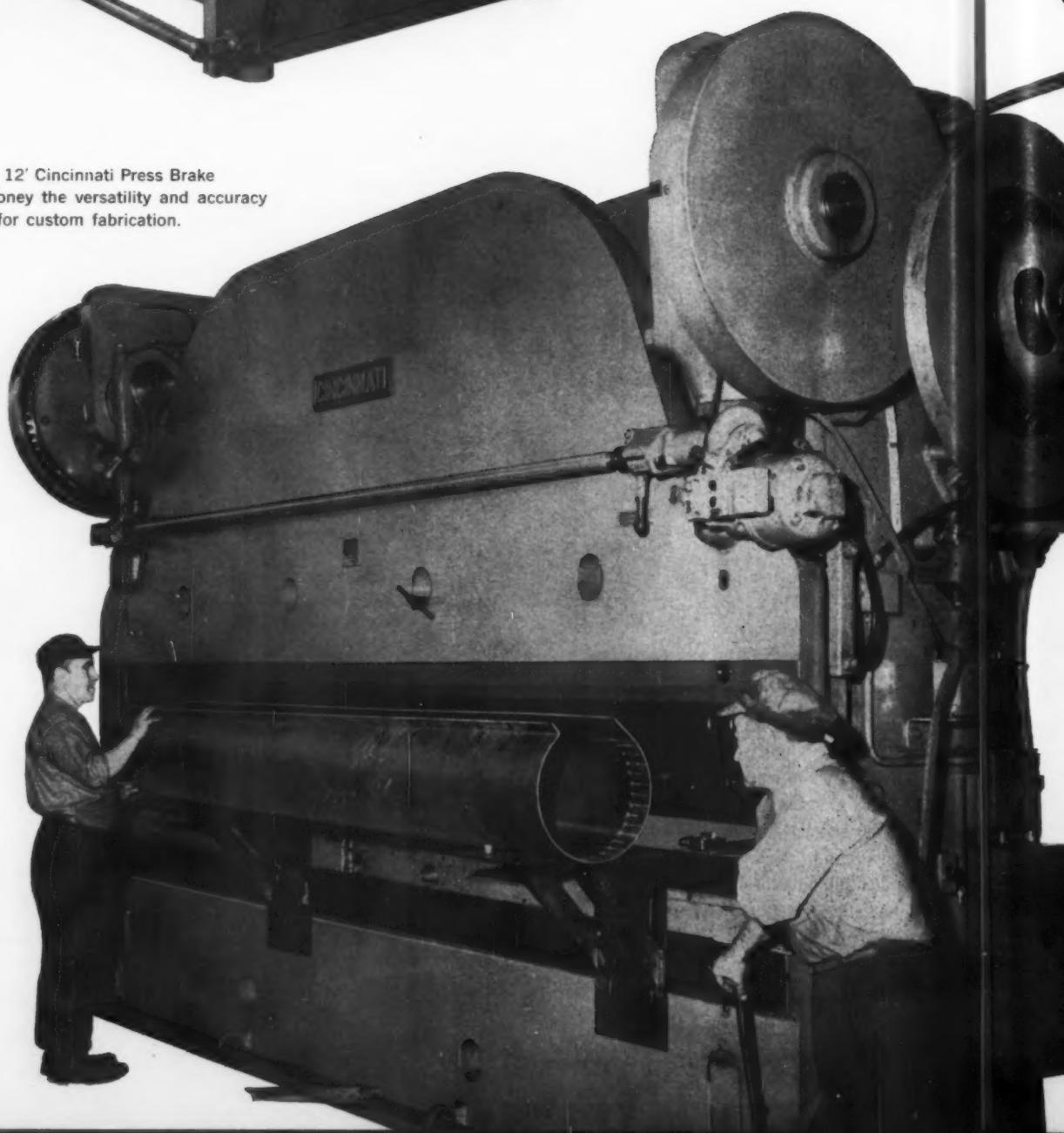
**National Tube
Division of
United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York



2510 Series Cincinnati Shear
($\frac{3}{8}$ " x 10' capacity) cuts steel
plate with consistent accuracy.

13 Series 12' Cincinnati Press Brake
gives Mooney the versatility and accuracy
required for custom fabrication.





"From brackets to buildings,"
Mooney Iron Works Co. fabricates steel
products on maintenance-free
Cincinnati Press Brake and Shear.



"Not a penny's worth of maintenance since 1953!"

"We haven't spent a penny on maintenance of our Cincinnati® Press Brake and Shear since we got them in 1953," says John L. Mooney, President of Mooney Iron Works Co., Cleveland.

Yet these two machines have been worked hard, day after day, in Mooney's fabrication of structural steel products which range "from brackets to buildings."

By keeping costs down, this extra-rugged Cincinnati stamina helps Mooney compete aggressively and get new business. You can earn these same profits; put Cincinnati Press Brakes and Shears to work in your shop.

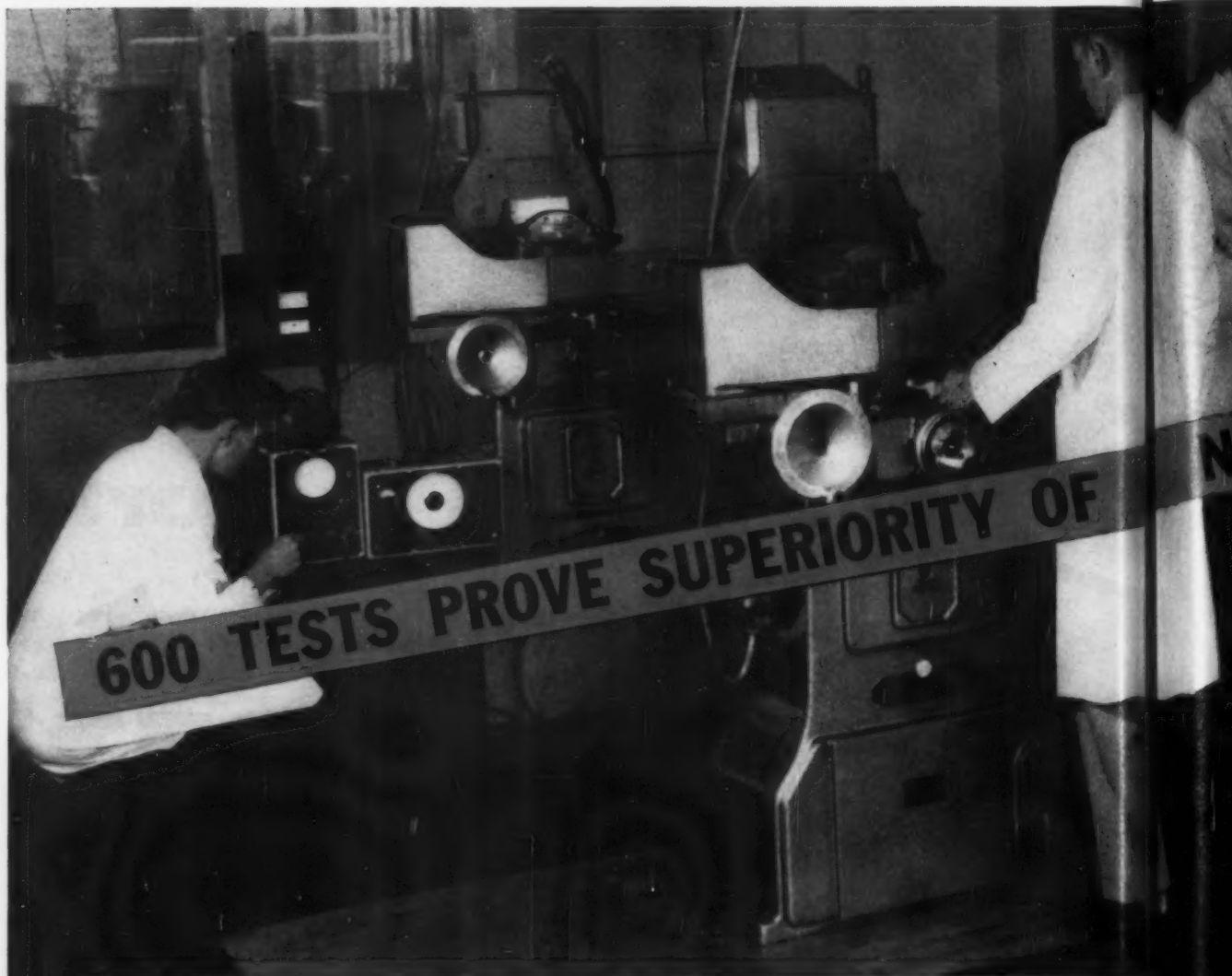
Write Dept. B for Bulletin CS-4, which covers all Cincinnati equipment.



Cincinnati 11, Ohio, U.S.A.

Shapers / Shears / Press Brakes

**THE CINCINNATI
SHAPER co.**



600 TESTS PROVE SUPERIORITY OF

30% TO 50% LONGER LIFE FOR RESINOID-BONDED DIAMOND WHEELS

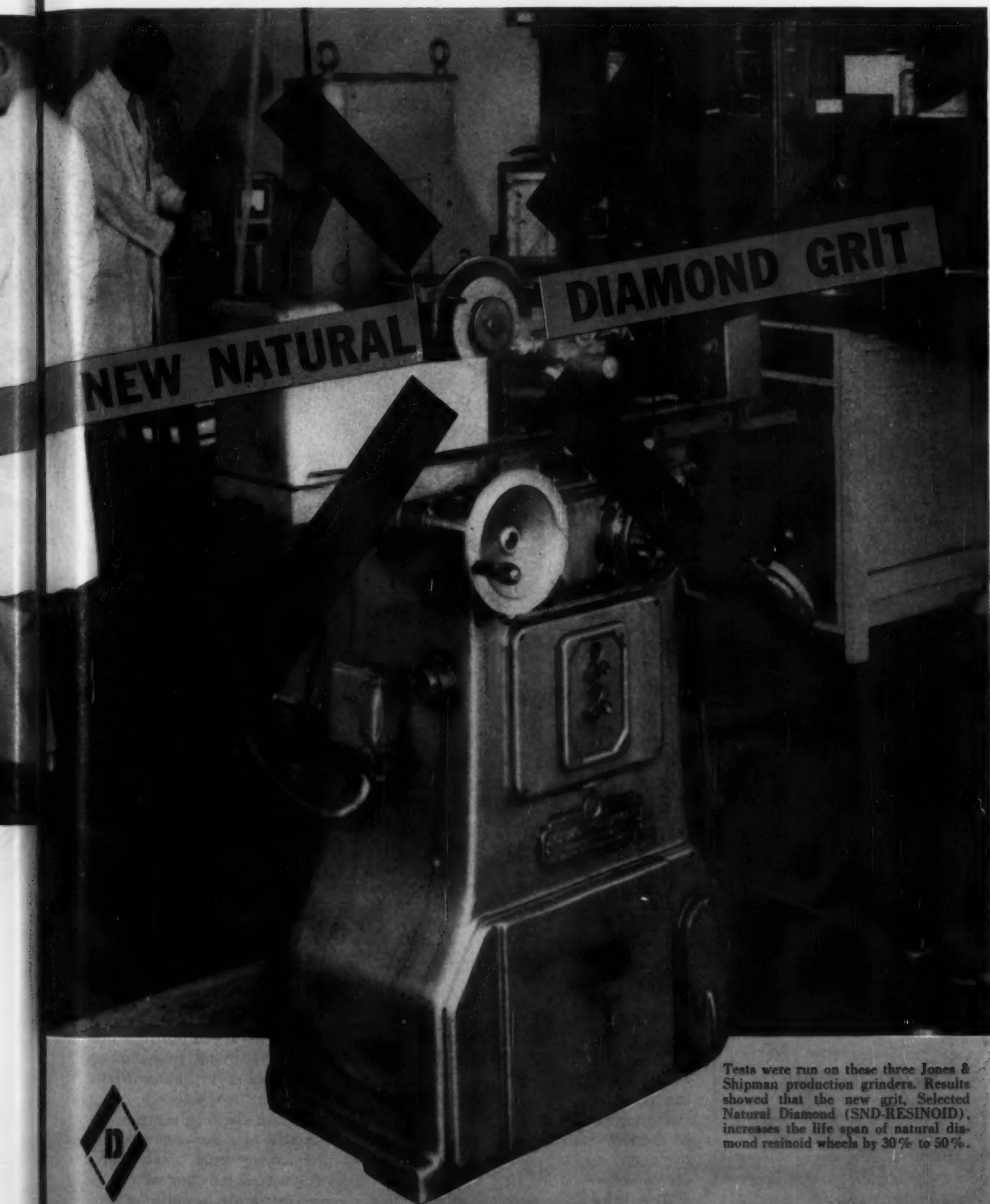
Six hundred separate trials, using 145 wheels, were run by the Diamond Research Laboratory to test a completely new type of natural diamond grit for resinoid wheels. The results: this new grit increases the life of natural diamond resinoid-bonded wheels by 30% to 50%.

The particles of this new grit do not readily pull out of the bond. Instead, they break down into ever-finer fragments which constantly expose new, sharp cutting surfaces.

TEST EQUIPMENT: Three 18" Jones & Shipman production grinders were fitted with special spindles to enable wheels to operate at 5500 surface feet per minute, the speed generally used in diamond grinding.

The wheels were of the D1A1 type, 6" in diameter, 3/16" face width, with 1/8" depth of resin. Each wheel contained 31 1/4 carats of the new grit. Metal to be ground was tungsten carbide of the same quality normally used for milling cutters, lathe tools, etc. During the course of the tests, 700 pounds of hardest carbide were ground away.

RESULTS: This new friable grit, Selected Natural Diamond (SND-RESINOID), increases the life of natural diamond resinoid wheels by 30% to 50%, depending on the type of job at hand. The grit will be available to your wheel manufacturer soon. Next time you order diamond resinoid wheels, specify SND-RESINOID... the most economical and the most efficient grit you can use.



Tests were run on these three Jones & Shipman production grinders. Results showed that the new grit, Selected Natural Diamond (SND-RESINOID), increases the life span of natural diamond resinoid wheels by 30% to 50%.



INDUSTRIAL DISTRIBUTORS (SALES), LTD.

YOU CAN DEPEND ON NATURAL DIAMONDS



Announcement

New Britain's new and completely modern Rebuild-Retool Center at Bridgeport, Michigan, is important to every present and prospective owner of New Britain Automatics.

This is the first center established

exclusively for the rebuilding and retooling of production machinery. It is staffed by men trained specifically for this type of work. It is equipped specially for putting New Britains back on the job with maximum efficiency in minimum time, at minimum expense to the owner.

Rebuilding and retooling may be "orphan jobs" elsewhere, but they rate top treatment at New Britain. Here is an important extra reason for selecting

a New Britain when you purchase new equipment—a full time specialist organization devoted to protection of your investment.

If you would like to investigate the profit potential in a complete modernizing program, or could profit from a factory-engineered retooling of one or more machines, write us either at New Britain, Connecticut, or Bridgeport, Michigan. The New Britain Machine Company.



Oil well pump chain housing is positioned for flat welding with Jetweld. Welding speed is doubled.

OIL FIELD PUMPING UNITS NOW WELDED TWICE AS FAST

Doubling welding shop production without increasing their investment in labor or machines was accomplished by the Parkersburg Rig and Reel Company at Coffeyville, Kansas.

This firm manufactures oil field pumping units. The complete structure of these units is welded and varies in size depending upon the requirements of the well on which they are to work. Bases are fabricated from as small as 8" 17 lb. beams to as large as 14" 68 lb. beams. One exceptionally large unit used a 36" 210 lb. member for the walking beam.

Under the supervision of Jess Kern, Plant Manager and Sammy Doss, Welding Foreman, tests were conducted in the Parkersburg shop in an effort to increase welding efficiency.

A Lincoln welding engineer, Robert Clipsham, surveyed the

welding operation. He studied the procedures used and conducted tests with various electrodes and equipment.

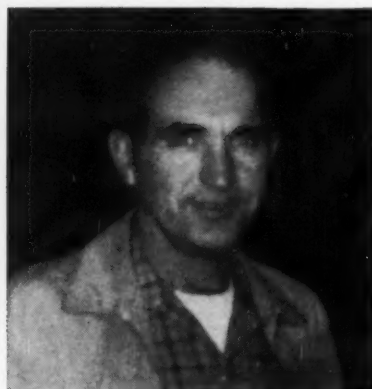
The survey indicated that with minor positioning changes almost every weld could be made with a faster, easier-operating iron-powder electrode.

Parkersburg is now using Jetweld 1 electrodes almost ex-



Completed chain housing mounted on base fabricated from I beams.

clusively. Mr. Doss says, "Jetweld is twice as fast as the conventional electrodes we were using. It gives us better looking welds, mileage per rod is greater, and weld cleaning is much easier and faster."



Sammy Doss, Welding Foreman at Parkersburg Rig and Reel has switched to Jetweld almost exclusively.

For help with welding procedures and cost reduction ideas call your Lincoln welding engineer today.

NEW WELDER TAILORED TO YOUR NEEDS

The new Lincoln Idealarc "TM" welder has been designed to meet the needs of any shop.

The key to the "TM" model's versatility is a wide range of options that expand the uses for the machine.

These new Idealarcs are available in 300, 400, 500 and 650 amp sizes.

Bulletin 4607.1 has all the details. A copy may be obtained by writing The Lincoln Electric Company.

THE LINCOLN ELECTRIC COMPANY

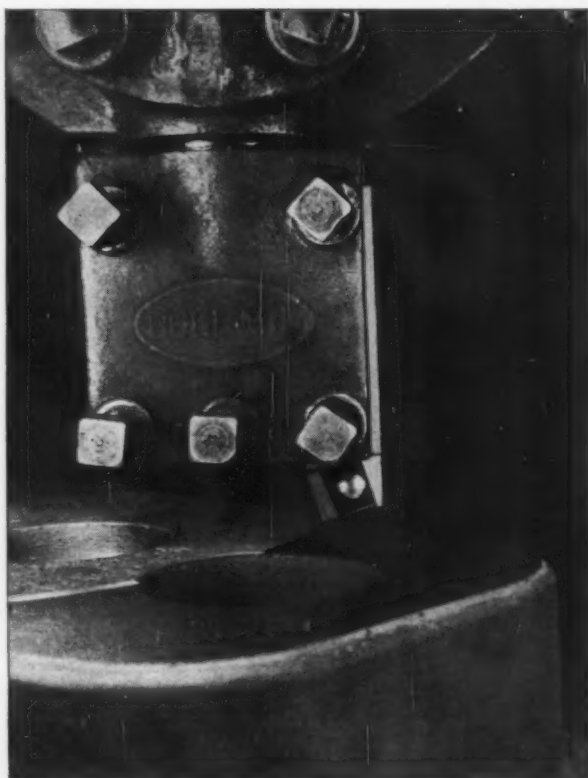
Department 1559 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

LINCOLN
...USA

THEY SPEND MORE pennies

TO MAKE MORE dollars



Without coolant, this Bullard lathe makes a .125 rough cut and .050 finish cut using Kennametal Grade K6 Inserts in a Kendex* (patented) holder. Sand holes in the castings add to the difficulty of an interrupted cut. Photos and production data courtesy of American Coleman Company, Littleton, Colorado, manufacturers of trucks, tractors, front drive axles, and related parts.

	50 RPM 24 Minute Tool Life	88 RPM 15½ Minute Tool Life
Feed	.027	.027
Cutting Time:		
First side—rough cut	7 minutes	4½ minutes
First side—finish cut	7 minutes	4½ minutes
Second side—rough cut	5 minutes	3¼ minutes
Second side—finish cut	5 minutes	3¼ minutes
Total cutting time	24 minutes	15½ minutes
Pieces per cutting edge	2	1
Machine cost per hour	\$6.00	\$6.00
Tool cost per hour	.075	.27
Machine and Tool cost/8 hours	\$48.60	\$50.16
Pieces finished per 8 hours	5	9
Cost per piece	\$9.72	\$5.57

KENNAMETAL^{*}

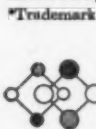
tooling permits 75%
SFM increase...
cuts cost per piece
almost in half

Like many others, this plant is sacrificing pennies in tool costs to make dollars in production profits. At 50 rpm, this boring mill faced cast iron housings at a maximum speed of 289 sfm. Each Kennametal cutting edge faced both sides of two pieces with production averaging 5 pieces per 8-hour shift. When the maximum speed was increased to 510 sfm, the cutting insert had to be changed for each piece.

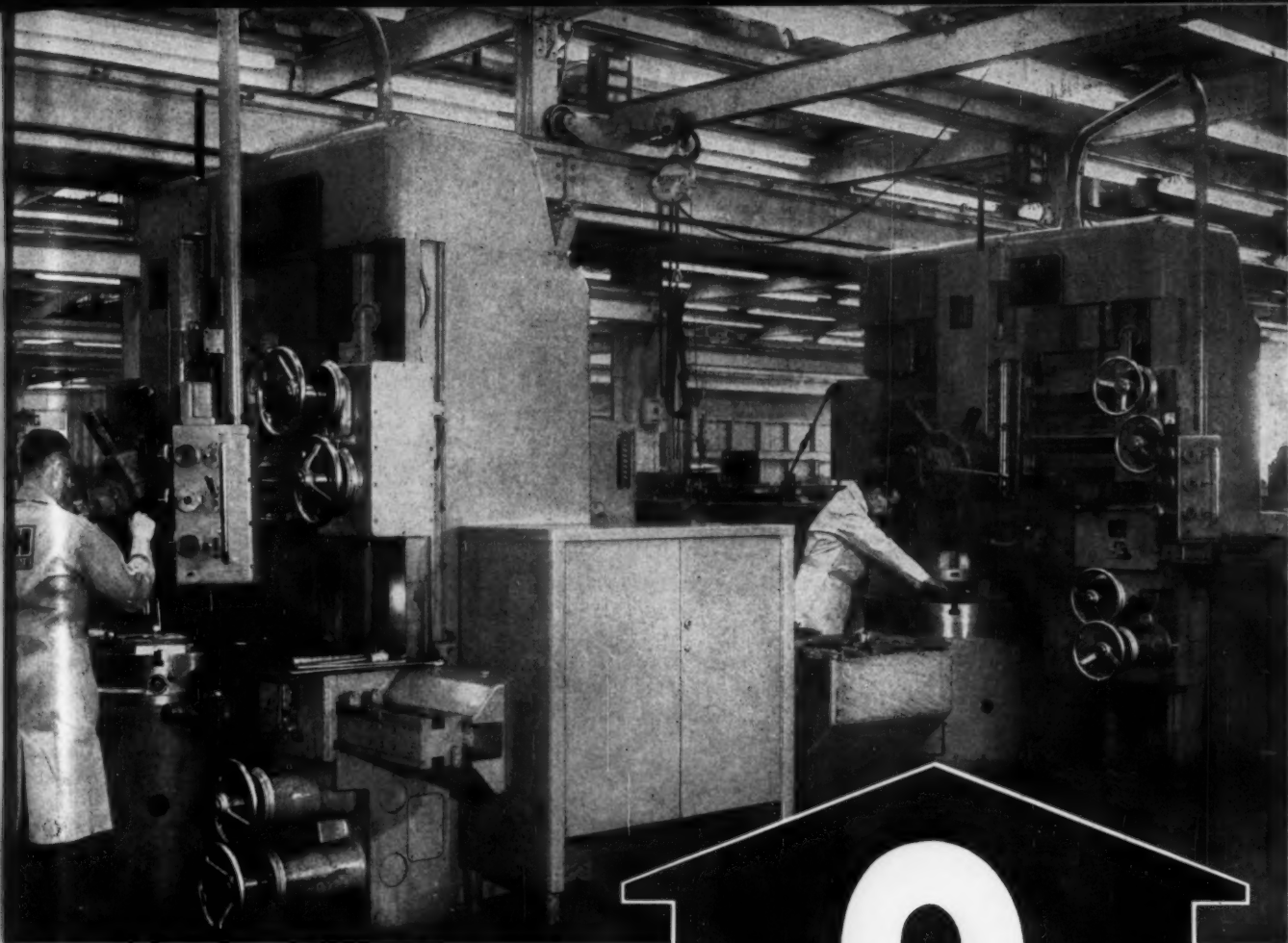
This reduction in machining time, plus some additional time saved by an improved method of holding the workpiece, enabled production to increase to 9 pieces per shift.

Sacrificing a few pennies of increased tool costs to make dollars in production profits is not a new idea. It has been proven-in-use by many progressive plants, and we will gladly send you records of such operations. These results can be duplicated in other plants where machines and talented operators have been held back by old ideas about tooling and tooling costs.

Ask your Kennametal Carbide Engineer how Kendex* (patented) tooling can help you get more efficient output from your machines . . . or write direct for the booklet, "There's Profit in Retiring a Tradition." KENNAMETAL INC., Latrobe, Pennsylvania. 97237



INDUSTRY AND
KENNAMETAL
...Partners in Progress



IT PAYS TO REPLACE . . .

A study of the production factors at The Heald Machine Company, Worcester, Mass., pioneer New England builders of precision machine tools, indicated that two Bullard Cut Master V.T.L.'s, Model 75, would produce as many parts, in any given period, as four Bullard V.T.L.'s of an earlier design.

when

do the work of four

In actual production, these additional advantages have been experienced:

- Greater flexibility for faster changeover and set up • Ease of control — less operator fatigue
- Dependability and accuracy on holding size • Less tool wear, spoilage and inspection
- More rigidity for higher speeds and feeds

This all adds up to more parts at less cost per piece.

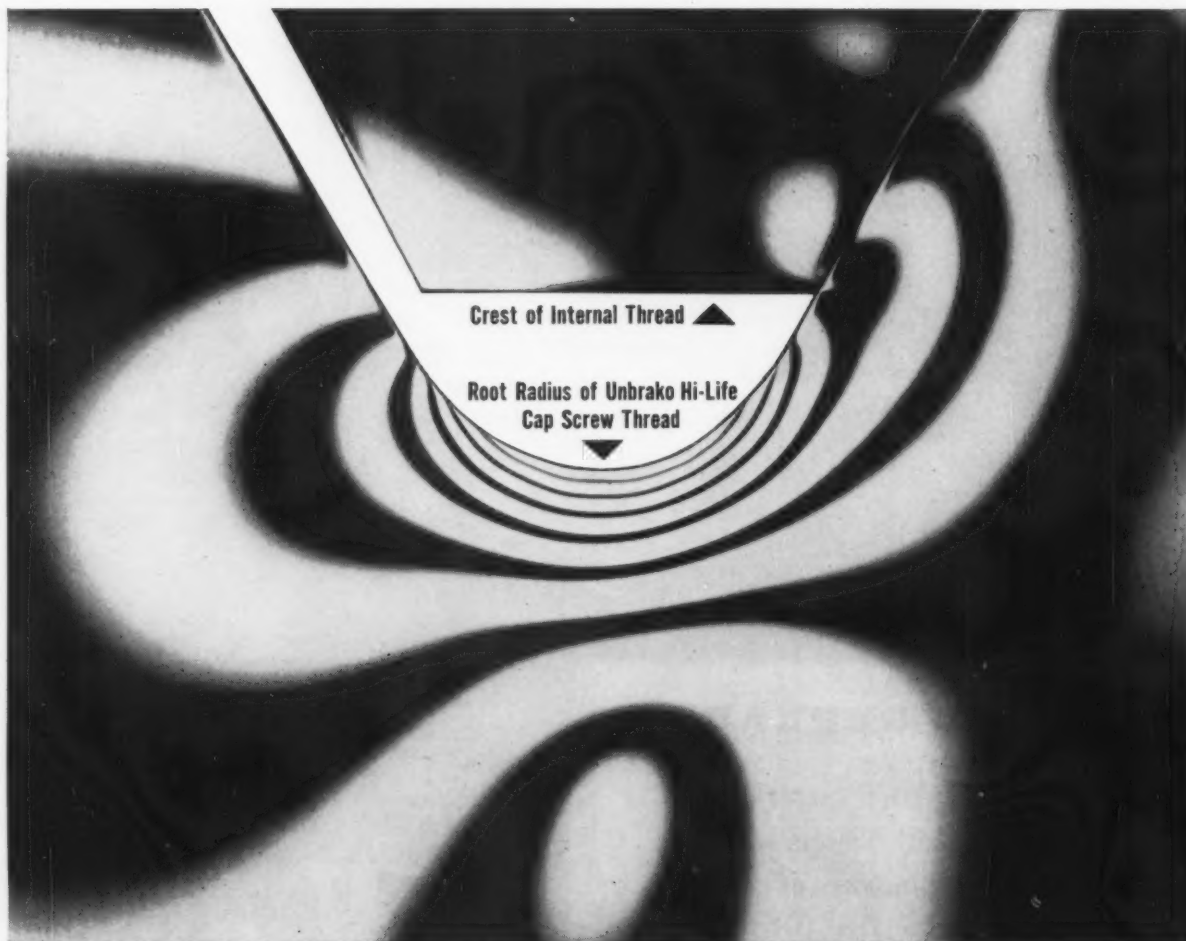
Perhaps an analysis, by a Bullard Sales Engineer, of your machining procedures will reveal "hidden savings" for you.

Why not ask him or write.

BULLARD

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

The big change is in the threads



STRESSES ARE DISTRIBUTED. Photoelastic study shows how the thread root radius of the new UNBRAKO Hi-Life socket cap screw blends smoothly into the flanks of the threads to reduce stress concentration and increase fastener fatigue life.



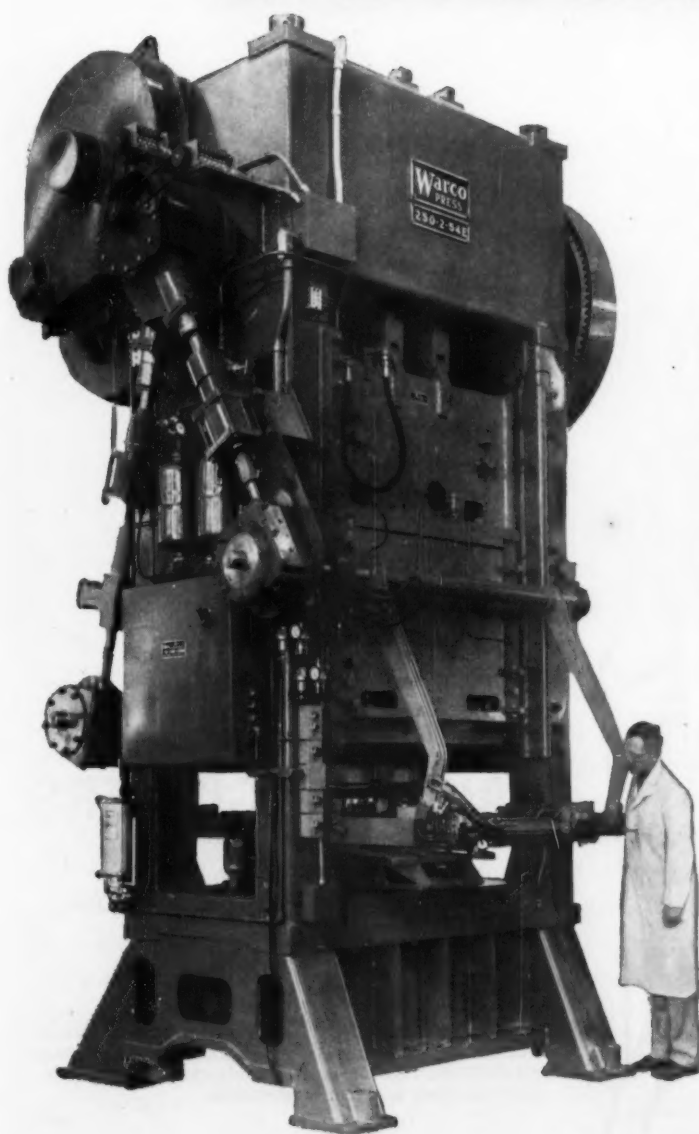
Improved thread root form, developed by SPS research on high-strength fasteners, now standard on all new UNBRAKO Hi-Life socket head cap screws. And at no increase in price.

Radiused thread root lengthens fatigue life as much as 100% and increases tensile strength of new UNBRAKO Hi-Life socket cap screws. For the first time, this high-strength thread design is available to industrial users. Higher reliability of new fasteners provides assurance of longer life for your product. Bulletin 2577 gives complete details. Ask your authorized SPS industrial distributor for a copy. Or write SPS—manufacturer of precision threaded industrial fasteners and allied products in many metals, including titanium.

INDUSTRIAL FASTENER Division **SPS**

JENKINTOWN 17, PENNSYLVANIA

Warco automation



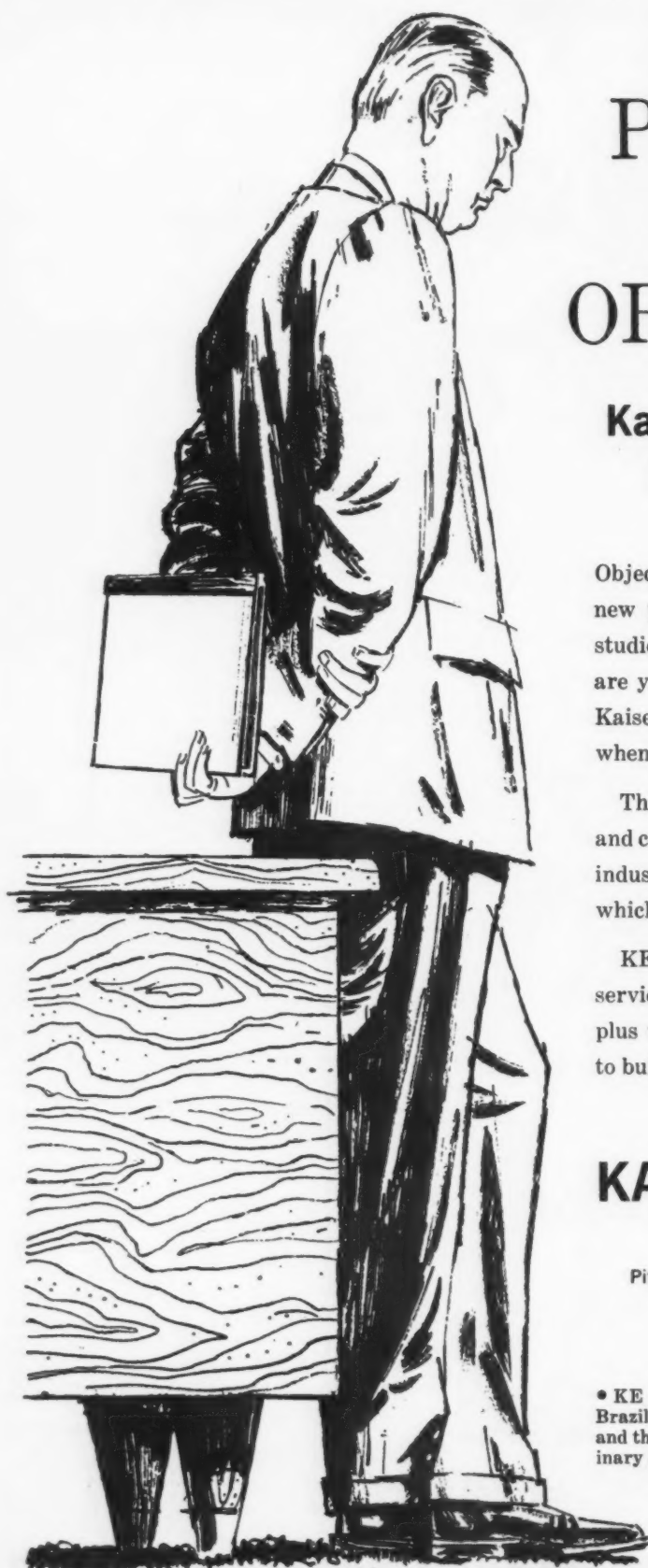
You can expect mechanical presses of unsurpassed quality when you specify Warco, for every Warco press is designed and custom built with machine tool precision. The result: Warcos work better, faster—with substantially reduced maintenance.

This typical Warco 250 Ton Double Eccentric Shaft Straight Side Press is being used by a leading farm equipment manufacturer to automatically feed and *hot form* the camber and accurately punch and countersink bolt holes in heavy gauge plow shares, discharging them automatically into a heat treating bath. Press slide incorporates a hydro-pneumatic overload device.

If you're considering press equipment, remember . . . if you want maintenance-free quality—you want Warco.



THE FEDERAL MACHINE AND WELDER COMPANY • WARREN, OHIO



PROCEED, DEFER OR MODIFY?

Kaiser Engineers can help you decide

Objective analysis is vital to sound decision on new plant or expansion projects. Feasibility studies, economic analyses and site evaluations are yours by an outside, impartial firm when Kaiser Engineers is selected to help you decide when, how and where to proceed.

These services are in addition to the design and construction of major facilities for the Steel industry—including the proven L-D Process for which KE is the U. S. licensor.

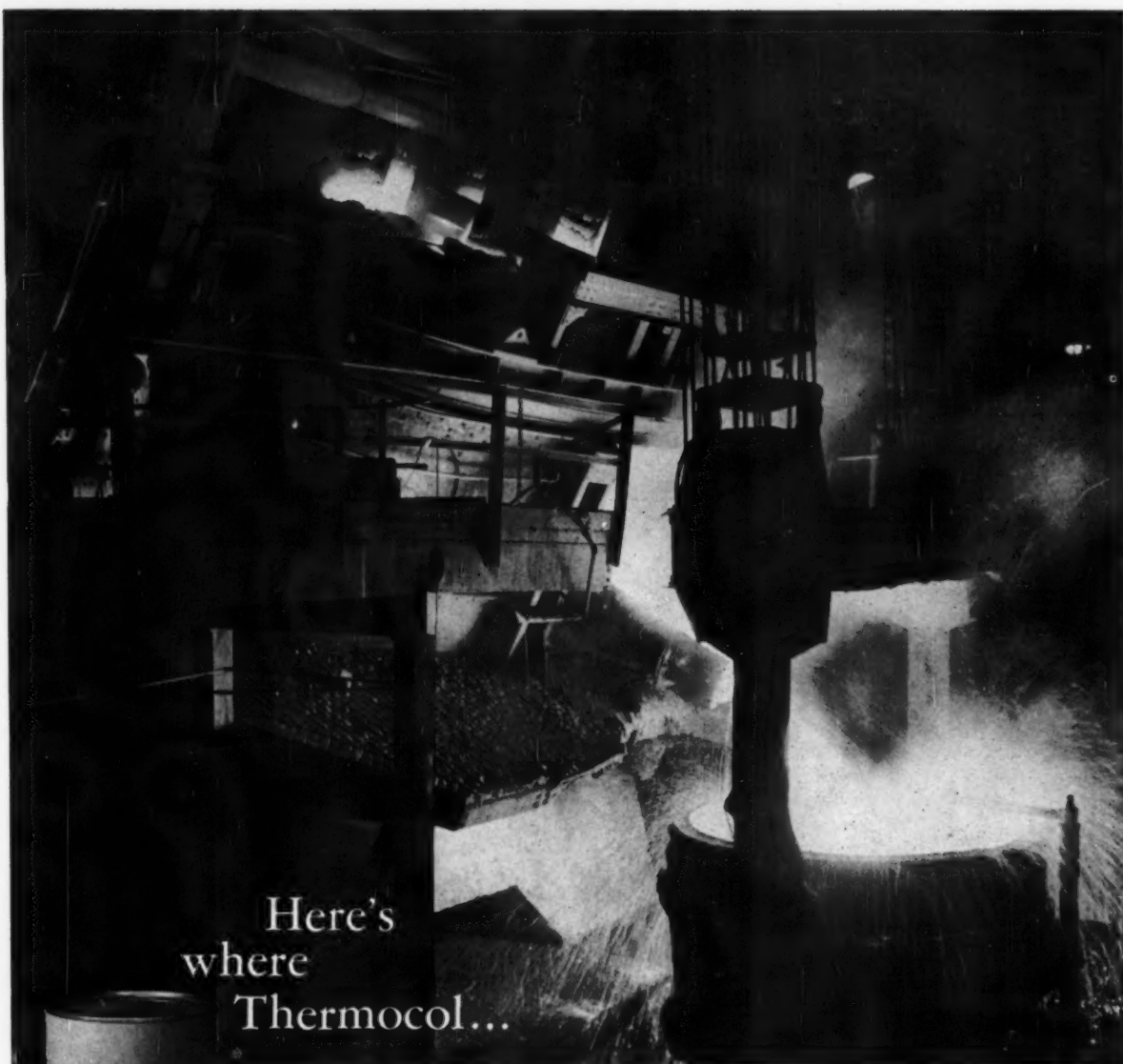
KE offers complete, one-company, integrated service from concept through construction—plus world-wide experience and the ingenuity to build quickly, within budget.

KAISER ENGINEERS

Division of Henry J. Kaiser Company
Oakland 12, California
Pittsburgh, Washington, D. C., Chicago, New York

• KE projects include work in Argentina, Australia, Brazil, Formosa, Japan, New Zealand, as well as Canada and the United States. Assignments range from preliminary planning to plant construction.

5488-S



Here's
where
Thermocol...



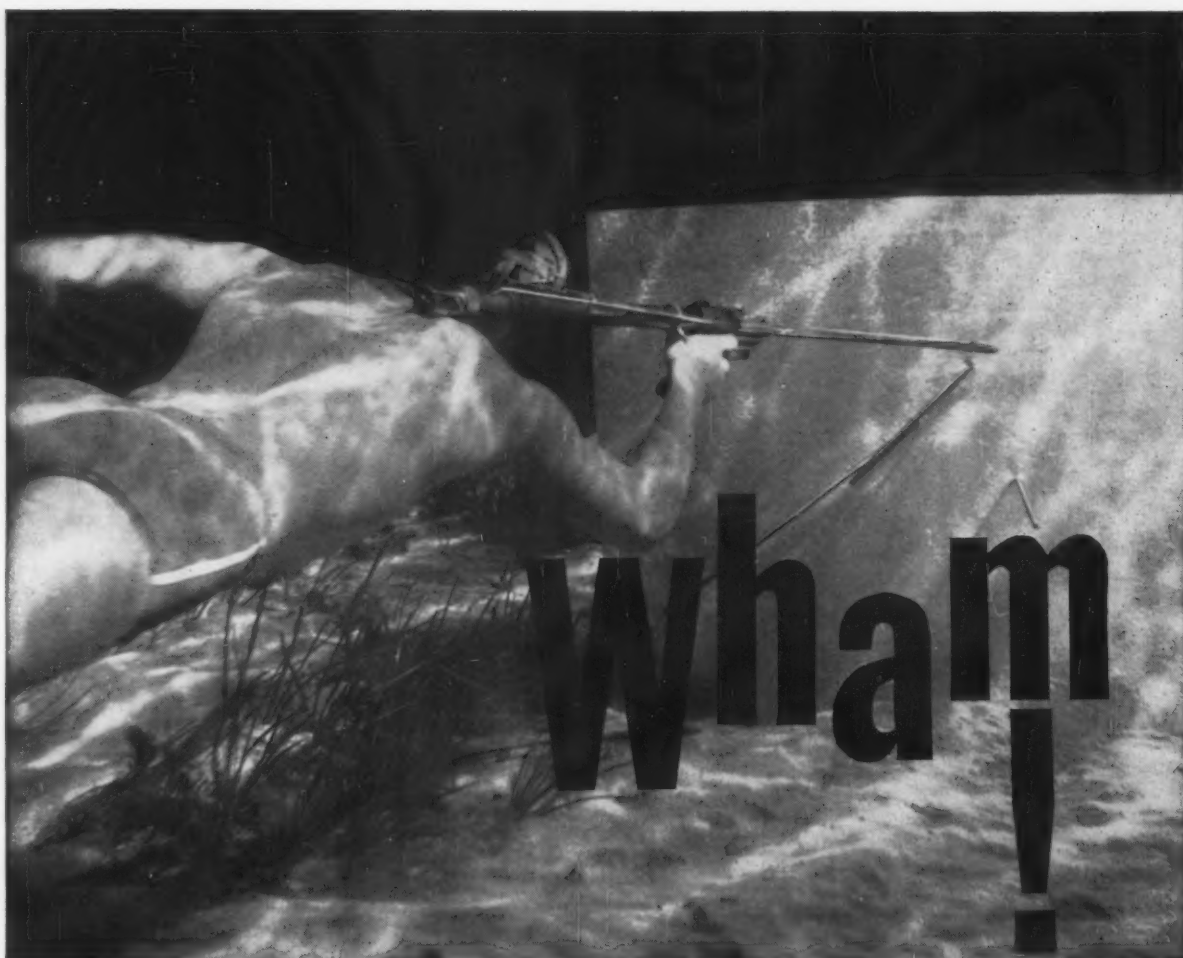
saves you \$7 a ton! The high efficiency of Vancoram Thermocol® (Exothermic Ferrocolumbium) adds up to impressive savings for makers of columbium-bearing stainless and high-temperature steels and alloys. Columbium recoveries are in excess of 90% compared with 80% for regular ferrocolumbium additions. This consistent high recovery, coupled with shorter furnace time and elimination of wastage loss, results in greater economy to the user.

Thermocol is packed in handy, color-coded cans, palletized for easy handling. Each sealed can contains an exact amount of columbium for convenient ladle addition. Call your nearest VCA District Office for facts about this new alloy and other products in the complete line of Vancoram Exothermic Alloys. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, New York • Chicago • Cleveland • Detroit • Pittsburgh

Producers of alloys, metals and chemicals



**VANADIUM
CORPORATION
OF AMERICA**



Photograph by famous underwater hunter-photographer Jim Thorne

DEEP SEA HUNTER FAILS TO FLAKE INLAND TI-CO®

More than a match for ferocious 700-pound hammerhead sharks, this compressed-air powered gun fires underwater spears with terrific force. Again and again its high-speed missiles pierced this Inland TI-CO galvanized sheet, yet at the edges around the holes there wasn't a trace of flaking of the zinc coating.

Yes, you can perforate TI-CO sheets. You can subject them to deep-drawing, spin-drawing, punching, crimping, Pittsburgh lock-seaming, in fact the toughest fabricating processes—but you won't flake TI-CO!

No wonder TI-CO galvanized sheets are top-choice with manufacturers in such a wide variety of new applications and products. TI-CO is manufactured with dry, oiled or chemically treated surfaces to meet your production needs. It comes in sheets or coils in gages 8 to 30 inclusive and in widths as great as 60 inches. Specifications, application and performance data, complete information, is all contained in a free TI-CO booklet we'll be glad to send at your request. For your galvanized sheet or coils requirements, consult your Inland representative.



Close-up inspection shows no flaking of TI-CO's zinc coating



INLAND STEEL COMPANY

30 West Monroe Street • Chicago 3, Illinois
Sales Offices: Chicago • Davenport • Detroit • Houston • Indianapolis • Kansas City • Milwaukee • New York • St. Louis • St. Paul

THE MOST IMPORTANT NEW ELEMENT in metalworking is the advent of new small cars. While the full impact remains to be seen, some of the official thinking is coming out of Detroit previews. E. N. Cole, general manager of Chevrolet and man behind the Corvair, predicts 1960 sales of his division's small car will hit 300,000. Production by Oct. 2 will pass 30,000.

ALL-IMPORTANT PRICE TAGS ON THE CORVAIR are about as expected. The least expensive 2-door model will list at \$1810. But this does not include taxes, delivery and handling charges, or any optional equipment. It is doubtful if a buyer can drive one away for less than \$2000. And the 2-door models will not be in production until Jan. 1 of next year.

SLOWDOWNS AND IMPENDING SHUTDOWNS are starting to occur with greater frequency as the steel strike effects tighten. Shutdowns of the farm equipment industry are beginning in earnest. At least two major producers and several smaller manufacturers of farm equipment are laying off workers. This is in the midst of a very strong demand.

IF THEY CAN AVOID EFFECTS OF THE TIGHTENING cold-rolled sheet market, appliance makers are assured of a good year. Some industry sales figures for the first seven months: Electric household refrigerators, up 24 pct from last year; farm and home freezers, up 26 pct; electric ranges, up 30 pct; and dishwashers, up 34 pct.

PREDICTIONS FOR CAPITAL SPENDING in the rest of this year are encouraging. The latest survey of business intent (conducted by the Dept. of Commerce and the Securities and Exchange Commission) indicates spending for new plants and equipment will be 9 pct higher than last year. Outlays are now expected to total \$33½ billion. Second half predictions indicate some upward revision of earlier plans and also an uptrend from first half spending.

PREDICTIONS FOR 1960 from Tom Campbell, Editor-in-Chief of The IRON AGE, call for: Steel output to exceed 125 million tons; FRB Index of Industrial Production, now at 151, to pass 160 before the middle of the year; auto sales to exceed 7 million units; consumer spending to reach an all-time high; housing starts to hit about 1.25 million. The forecast was made before the Pittsburgh Chapter, National Industrial Advertisers Assn.



**on the Mighty Mississippi . . . a single
Cleveland reducer drives this dredge's
48-inch auger**

Keeping America's major rivers navigable is a tremendous year 'round job. It takes rugged dredges that can stay on the job 24 hours a day, if necessary.

This 12-inch hydraulic dredge operated by the Ferd J. Robers Company of Burlington, Wisconsin moves approximately a million yards of sand, gravel and muck from the Mississippi River bed annually. Its 48-inch diameter knife is driven by a large Cleveland Worm and Gear speed reducer that's providing trouble-free service year in — year out.

Many Clevelands are still in use today after more than 35 years of rugged service in mills, mines and on all types of industrial equipment. Whenever a powerful, trouble-free, right angle drive is required, consult your local Cleveland representative — or write us direct for Bulletin 145. It gives the complete Cleveland Story.

**The Cleveland Worm & Gear Company
3282 East 80th St., Cleveland 4, Ohio**

A subsidiary of
Eaton Manufacturing Company

Affiliate: The Farval Corporation

CLEVELAND
Worm Gear
Speed Reducers

Iron Ore Shortage Threatened As Shipping Time Runs Out

At best, it will be a costly job to supply blast furnaces with ore through the winter.

Ore carriers on the Lakes now count on shipping into December. Stocks of imports will help out too.—By T. M. Rohan.

■ Even if the steel strike ends shortly, the industry faces a serious iron ore shortage in some areas next winter.

To make matters worse, labor problems with longshoremen and railroad unions threaten emergency measures that could ease the pinch. These are heavy shipments of foreign ores from Coastal ports and railroad shipments from the Mesabi.

Little Time Left—Like the steel mills, the industry's iron ore mines and fleets of ore carriers in the Great Lakes regions are idled by the strike. Because of the short shipping season—to early December at the very latest, much valuable shipping time has been lost that can not be regained. And time is running out.

The iron ore industry likes to say that no blast furnace has ever been shut down for lack of iron ore. Probably that won't happen this year, but it will be a costly and tough job to maintain that record.

The Situation—Iron ore stocks at mills and nearby public docks were about 44 million tons at start of the strike, 27 million of it at

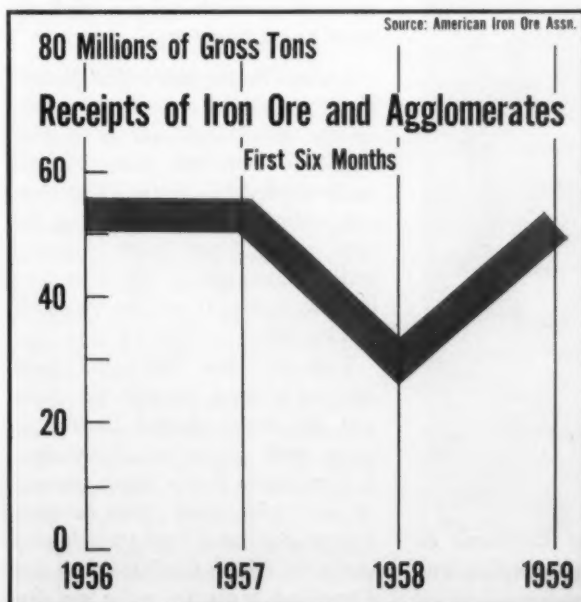
lower Great Lakes ports. This is about four months operating supply. If the Great Lakes fleet can get under way by Oct. 1, about another two months supply can be brought down before the ice closes in.

This would carry through until March. Rail shipments would make up the deficit at very high cost. Marquette, Mich. to Detroit all water runs \$1.80 and all-rail \$5.83 or half the net worth.

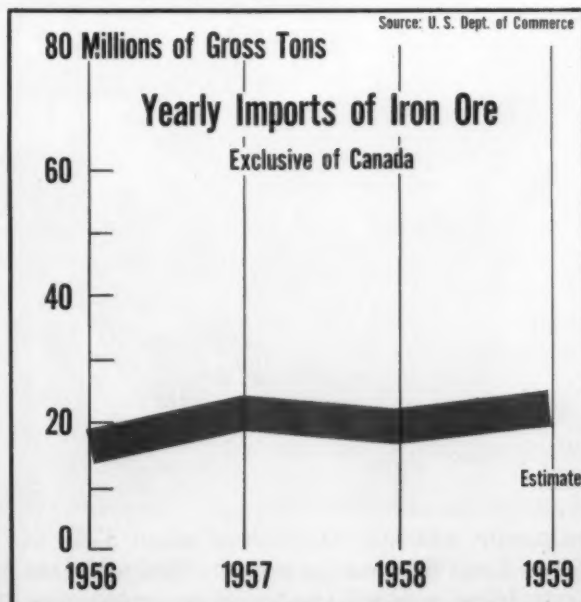
Grades a Problem—Tonnage, of course, is far from the whole story. The right grade at the right place is just as important. Some ore has come in during the strike from Montana to the northeastern Ohio area at a monumental rate. In the post-strike scramble, there will un-

Can Mills Make Ore Supplies Last?

Heavy First Half



Backed Up by Imports



doubtedly be considerable scrambling of grades and some swaps between mills and/or shippers. Southern and Far West mills have a lesser problem because of no seasonal interruptions of ore flow.

The major difference between this year's situation and previous tight spots in 1956 and 1952 is that 30 million tons per year, some of it year round, can now come in from overseas. Ore from South America has continued to come into eastern ports and will continue through the winter. From there it can be shipped to other districts by rail. It will be a tight squeeze and a costly one.

Ready to Go—Plans for a rush back into action by lake boats have been laid by individual companies for some time.

"We'll be out with just about everything that will float," says Vice Admiral Lyndon Spencer (U.S.C.G. Ret.), president of the Lake Carriers' Assn., Cleveland.

"If we can get going by Oct. 1, we can carry 20 to 22 million tons to lower lake ports by working into December and with a break in the

weather. A later starting date or early bad weather just cuts into it that much more. About a fourth of our fleet is already loaded so there will be a delay getting them unloaded."

Problems Ahead — The Great Lakes fleet has been just about paralyzed by the strike and only about 37 boats plus Canadian ones are moving. The whole fleet is mobilized for action as soon as the strike is over. But there are a host of other problems:

1. The possibility of a stevedore strike when the present contract runs out in the East on Sept. 30. A tieup could prevent the unloading of urgently needed foreign ore from Canada and South America.

2. Possibility of a railroad strike Feb. 1, as railroads try to cut featherbedding. This would paralyze movement of foreign ore by rail from East Coast ports into the Pittsburgh and Cleveland areas.

3. Major delays from boats piling up at loading and unloading points as well as at the Sault Ste.

Marie locks. A total of 57 boats are anchored in Duluth. Public dock facilities, too, are already glutted with ore so that some boats are riding at anchor for lack of a spot to pile it. These stockpiles, however, were intended only as transfer points and don't hold enough to be a major reserve.

4. Lake boats will be able to operate at light draft only during winter condition, so carrying capacity is materially reduced. After Dec. 1, insurance rates on boats are a major deterrent. In 3-day increments from Dec. 3, they double, triple and quadruple and from Dec. 12-27 they quintuple. And the customer pays the bill.

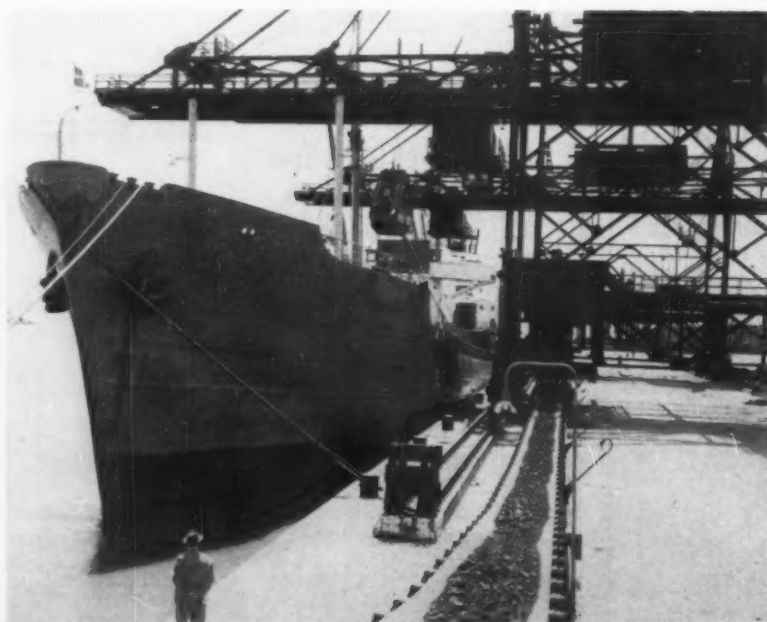
5. The most universal problem, of course, is cold weather operation with frozen ore. Steam thawing facilities are rather sparse since steam locomotives went out and new infrared heating is still in pilot stages. Jackhammers, picks and calcium mixtures are still the order of the day. During the Korean war, some frozen ore in rail cars was drilled and blasted loose with dynamite and some cars blew up with their load. Venezuelan ore is notoriously damp with about 10 pct moisture content, so it freezes solid.

6. Taconite plants — sintering plants and similar mechanized operations, like mills—have had no maintenance work during the strike and will probably take a week or more to get under way.

On the Bright Side—The picture is not all dark, of course. The policy on the lakes this year of getting out early with full fleets has already proved far-sighted. The eastern seaboard can receive ore the year round from South America and has continued to pile it up during the strike. It can be funneled out by rail.

Labrador ore has also been shipped in there through the strike and the Seven Islands harbor is open until about mid-November. It is probable that a heavy tonnage of ore will move from already glutted Baltimore and Philadelphia docks by rail to the Pittsburgh and Cleveland areas to make up late

Help From Foreign Ore



BUILDUP ALONG COAST: Ore import docks like the Baltimore & Ohio's Curtis Bay receiving point are filled to the top with stockpiled imports. Inland mills will rely heavily on imports after the strike.

winter shortages there. Although a difficult operation in cold weather, it is done regularly in smaller quantities.

On the Coast—Eastern railroads are stockpiling imported iron ore for struck steel mills. With the mills unable to accept shipment, the carriers are laying the tonnage down in port yards for delivery after the strike ends.

The Pennsylvania Railroad says over 4 million tons of ore has been stored at five ports (Philadelphia, Baltimore, Cleveland, Ashtabula, and Erie). This could all be regarded as "excess" tonnage, the Pennsy says, because the road doesn't normally stock ore until October when mill storage areas begin getting crowded.

More Laying Down—Another railroad, the Baltimore & Ohio, is stocking ore for customer mills "in the interior of the country" while the strike lasts. The ore is being stored at the company's Curtis Bay area near Baltimore. No figures are given out on the tonnage involved.

U. S. Steel, unable to accept ore at its Fairless Works, is laying tonnage down in several ports. These include Mobile, Ala. (a prime unloading point), Philadelphia, and Baltimore. The tonnage is no larger than that normally brought into the country this time each year, a spokesman says.

If the strike lasts into late September, Canadian ore mines in upper Quebec and Labrador might have to curtail their mining operations seriously because of lack of storage space at Seven Islands.

Other Measures—There are other sources the mills can turn to. Lower grades of ore will also be used in a pinch. Turnings will also probably be widely used to increase blast furnace yields.

Chicago is one of the most sensitive points. All-rail shipments from Upper Michigan, Wisconsin and Minnesota are only a last ditch resort. And the capacity is limited. In their biggest year, entire Lake Superior district all-rail shipments only hit about 5 million tons.

Firm Steel Stand May Force T-H

With the stalemate continuing and no break in sight, the possibility of T-H action grows stronger.

But there is a lot of skepticism about invoking the law.
—By Tom Campbell.

■ By now, the cynics agree that the strong steel industry stand in the labor hassle is not a gimmick. Few—if any—believe that there will be a hefty wage increase followed by a price increase—just as in the past.

Most frustrated by the steel stand are the union negotiators. They insist that the steel side has not bargained. The steel side answer: Maybe they haven't bargained according to the union's definition, but they have as far as they interpret bargaining.

"Odd" Bargaining—Federal Mediation people headed by Joseph F. Finnegan have also been confused by the bargaining. In a moment of exasperation last week Mr. Finnegan referred to the bargaining as "odd." It is, mainly because the steel industry shows no signs of "rolling over"—as it has done on past occasions.

Steel industry negotiators have paid no attention to "other" contract battles, wage increases in other industries, pressure from the union, pressure from Washington, and discussion among "outside" labor relations consultants, lawyers and this-is-the-way-it-ought-to-be-done, self-appointed settlers.

Industry Stand—The steel industry formula for getting the men back to work on a voluntary settlement basis runs somewhat as follows:

Contract language changes allowing management closer control over

local working practices so more efficient operations may be set up. This is a must before economic bargaining begins.

Economic bargaining after agreement on language. This to involve fringe benefit improvements the first year and a "moderate" wage increase the second year.

The Steelworkers to make the first offer on specific economic issues. The assumption is that it will be "somewhat" lower than the recent offer of 15¢ an hour (according to the union) and 20 to 22¢ an hour, according to the steel firms.

This setup has been the ground rules for the steel side for some time. It appears to allow no compromise—yet. But once the language stumbling block is scaled, it might not take too long to reach an agreement on other issues.

The union side ground rules are:

No retreat from hard-won local practices rules.

A substantial wage increase based on productivity gains and steel industry profits.

Retention of the cost of living clause. (The steel industry wants it eliminated.)

Since there will be no steel price increase, the wage package has to be quite low and non-inflationary. The odds favor a Taft-Hartley injunction with its 80 day cooling off period. Even then there may be no agreement. This would force the men on strike again unless they agreed to the companies' last offer at a National Labor Board election by the 75th day of the injunction period. The odds favor employees supporting the union and rejecting any company offer.

Industrial R&D Budgets Climb

This year industry is spending more to build up research and development programs.

Automotive, instrument and electrical machinery groups are leading in R&D budget expenditures.

■ American industry is spending 12 pct more for research and development this year than it did in 1958.

A survey conducted by the American Management Association shows that 64 pct of nearly 600 companies studied have raised their 1959 R&D budgets. Only 8 pct remained the same, and 28 pct made cutbacks. The 1958 R&D budgets totaled 4 pct above 1957 figures.

Automotive Leads—The annual analysis of R&D budgets showed that the automotive industry led the field of 23 industrial groups sampled, with an expenditure increase of 32 pct. Other leaders include instruments, 29.7 pct; electrical machinery, 23.8 pct, and metalworking machinery, 21.7 pct.

Only the miscellaneous machin-

ery and parts industry group showed an expenditure decline. This contrasts with 1958, when six groups lowered their R&D budgets.

Expenditures Up—New product expenditures in 1958 averaged 3.2 pct of the sales dollar, compared with 2.8 pct for the previous year. In the metalworking categories, general industrial machinery topped all other groups with a R&D budget totaling 7 pct of industry sales. Instruments and electrical machinery groups both spent over 4 pct, but less than 5 pct.

Dr. Philip Marvin, the AMA's R&D Division manager, said the analysis was developed to assist companies in formulating guide lines for the charting of their corporate growth problems. It provides some indication of the relative shift in emphasis that will be reflected ultimately in new product offerings in selected industrial groups.

Product Development — According to Dr. Marvin, product development activities today have a greatly magnified multiplying effect on earnings. New products tend to

produce added profits and part of these can be made available for expanded development programs.

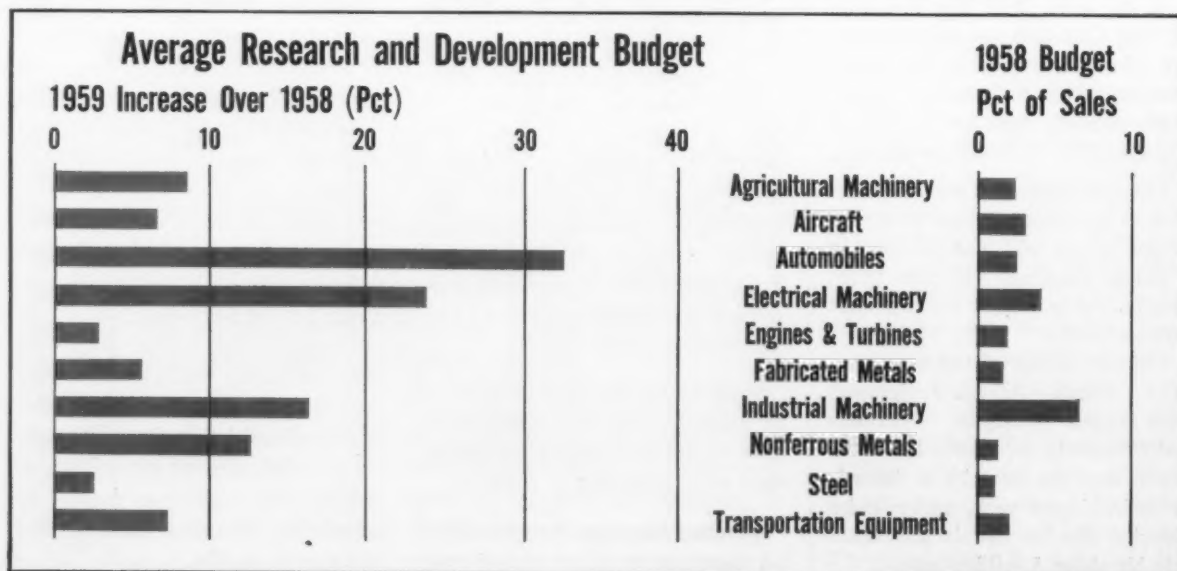
"Corporations that are ahead usually stay ahead," he said. "And it is becoming increasingly difficult for late starters to catch up."

Technology Important—Big achievements will depend more on technological capabilities and the use of technology than on the mere spending of money.

Corporations that can capture leading positions in the use of new technology within specific industries "can command their destinies, both with respect to directions taken and profit levels achieved," Dr. Marvin said.

Changing Times—He described technology as the "arch foe" of established order and procedure. He pointed out that while technological advances create radically new opportunities, they also create changing conditions that call for sweeping reappraisals of management thinking and action patterns if management is to turn them into profit.

How Does Your Research Budget Compare?



Aluminum Finds Tanker Market

Liquid Gas Transport Rated Big, New Potential

American Bureau of Shipping has approved the first liquid methane tanker.

There'll be two or three more right away, plus processing equipment—all made of aluminum.—By G. G. Carr.

■ When the world's first liquid gas tanker was recently successfully surveyed by the American Bureau of Shipping it was a significant day for the aluminum industry.

Test tankers for moving the dangerous liquid methane from well to market were made of aluminum plate. Now, Reynolds Metals Co. is calling the methane tanker "the largest single prospective new use for aluminum to come to the attention of the industry in recent years."

Methane is a major constituent of natural gas usually found in conjunction with oil. But while the heavier particles—ethane, butane, propane—have been stripped off and used, methane has been ignored or just burned off because it was too hazardous to process and ship.

Make it Pay—Constock Liquid Methane Corp. was set up jointly by Continental Oil Co., and Union Stockyard and Transit Co., Chicago, to see what could be done to develop its potential.

Constock had two major problems—liquifying, the details of which are still closely guarded by the company, and shipping.

The trick in shipping is to keep the temperature down to about minus 260°F. and under constant pressure. Slight changes in pressure at any higher temperatures will vaporize the methane with violent results.

Steel was ruled out for tanks because most alloys become brittle at such low temperatures, and special alloys would be too costly.

Strongest Tank—Aluminum was selected because its strength, ductility and shock resistance improve at lower temperatures. Constock bought enough aluminum plate from Reynolds to make five tanks, with 2000 ton capacity each. The aluminum was insulated with balsa wood, and steel jacketed.

A pilot plant to prepare the gas was set up at Lake Charles, La., and the first liquid methane tanker, a converted freighter, made a successful run to England.

Right now, it looks good for everyone. British Gas Council, a co-owner of the Methane Pioneer, the first liquid methane tanker, takes delivery in England. It is converted to the equivalent of manufactured gas and distributed through normal channels. Actual costs haven't been pinned down, but

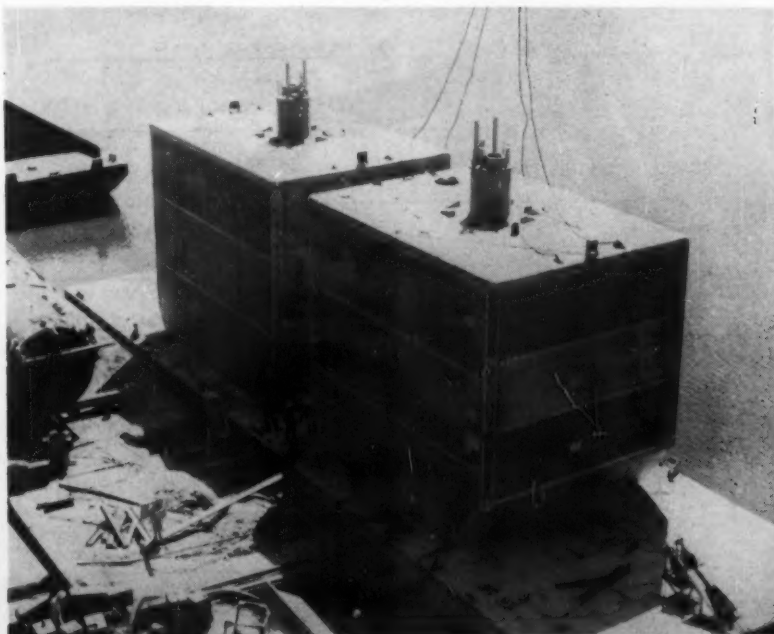
methane will definitely be cheaper than manufactured gas in England.

Markets—Other likely immediate markets are continental Europe, and perhaps Japan. For the long run, the greatest potential is in the underdeveloped countries all over the world, but particularly fuel-short Asia.

Shipping circles in both New York and London are predicting the world's shipyards will soon be making the new type vessel—the liquid gas tanker. Constock is already planning for two, possibly three, new tankers, ranging from 10,000- to 25,000-ton capacity.

And the aluminum companies, in addition to supplying large tonnages for tankers, will be selling heavy plate and shapes for on-shore processing and handling equipment.

Carry Methane to Market



ON THE WAY: Two welded aluminum tanks, made by McDermott & Co., Morgan City, La., are headed for a Mobile, Ala., shipyard. They will go into a freighter to make the world's first liquid gas tanker.

Diecasters Come Back Strong

Sales Are Running About 20 Pct Over Last Year

Optimism keynotes annual meeting as die casters look for even better business in 1960.

More captive auto shops loom as the independents' biggest headache.—By F. J. Starin.

■ There's a lot more optimism this year at the annual meeting of the American Die Casting Institute.

Diecasters converging on Chicago this week are boasting of business ranging from 10 to 25 pct better than the depths of 1958. The average is up close to 20 pct.

Look to '60 — But more than

that, many diecasters are convinced this is definitely the trend. There are exceptions, but, overall, diecasters expect 1960 to be even better. And some are even starting to look on the early 1960's as the coming "era of prosperity."

Estimates of how much zinc and aluminum will be diecast this year vary with the different appraisals of market influences. Generally, about 275,000 tons of zinc and 185,000 tons of aluminum is considered rock bottom. If, says ADCI, auto output hits 6.5 million, and labor strife doesn't take the edge off production is likely to hit 310,000 tons of zinc, 195,000 tons of aluminum.

Automotive Factor — Automotive, the largest single market for diecastings, is not contributing to the upturn in job shop business. This is likely to be the biggest problem for the independent diecaster in the next few years.

Says one diecaster, big enough and diversified enough to know: "The auto companies are doing more and more of their own diecasting. This appears to be the trend."

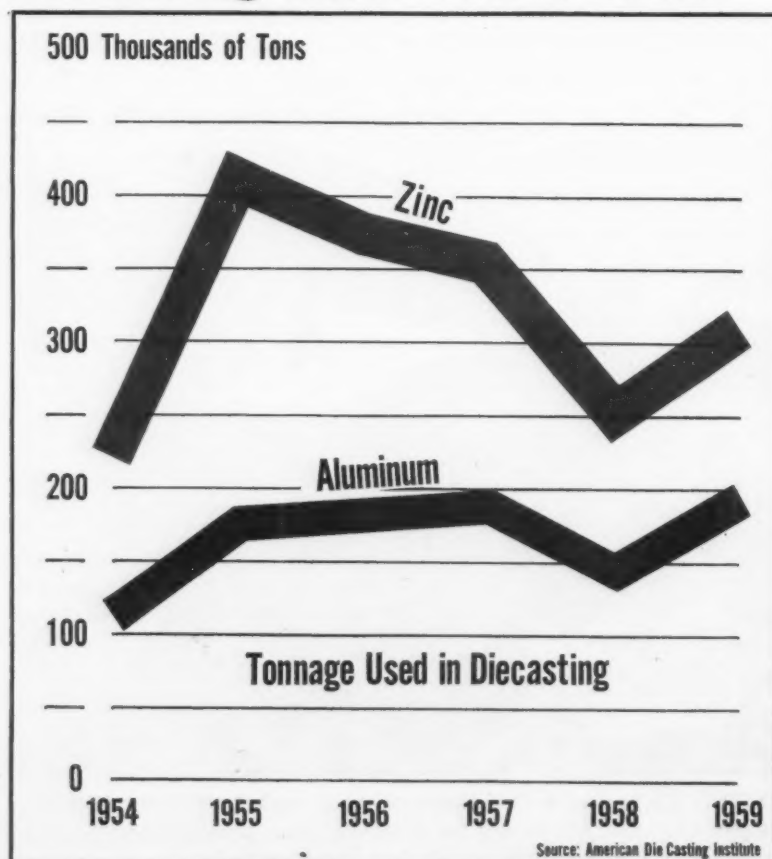
Another major caster pretty much agrees. "Five years ago we were getting 80 pct of the automotive business," he says. "Now we are getting about 25 pct. Of course the total is larger, but the percentages pretty well prove the direction things are going."

Expect a Share—When you start talking auto markets with a diecaster, the conversation inevitably gets around to the aluminum engine block. Even though the indications now are that the auto companies will do much themselves, diecasters aren't really worried.

They concede they can't compete on price if hot metal is sold to the automakers at a preferential price. But they believe that when the aluminum engine gets enough acceptance to be used on the big production run cars, the automakers will put a percentage of the work in the hands of jobbers, to have several sources of supply, and to avoid political pressure.

Zinc diecasters are more optimistic than they've been since the peak auto year of 1955 swelled total zinc used in diecasting to 410,000 tons. They say new and improved plating techniques developed by the American Zinc Institute's research program will help bring back some exterior automotive applications that had been lost.

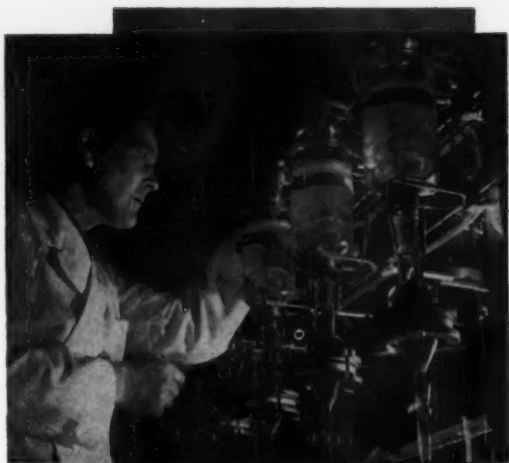
Diecasting Sales Trend Turns



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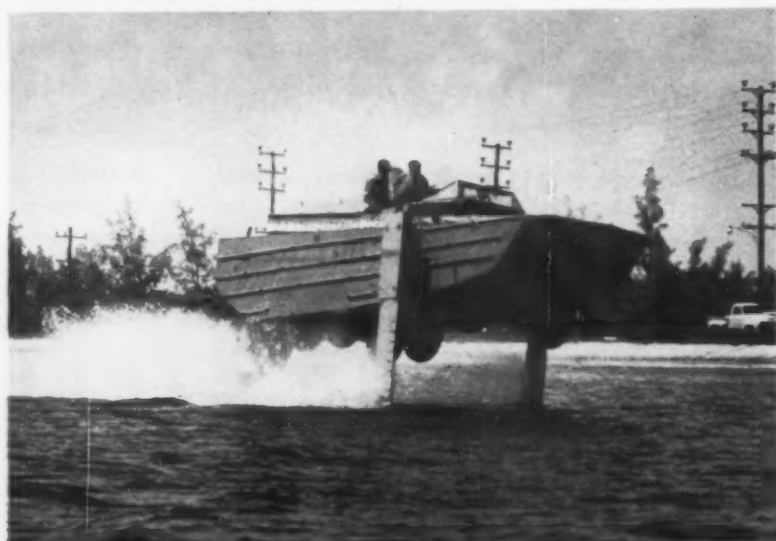
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Out-of-State Firms Freed of State Tax

A new law makes it clear that a state can't tax the income of firms that maintain no offices within its boundaries and whose activities consist only of sales.

Study Underway—At the same time, both the Senate and the House have begun a detailed study of the problems related to state income taxes. The basic plan here is to recommend uniform standards for states that impose income taxes. The congressional study is to be completed by July 1, 1962.

The new law is a direct outgrowth of several court cases involving the taxation by states of business income. One such case concerned International Shoe Corp., St. Louis, and its sales activities in Louisiana. Although International maintained neither offices nor warehouses in Louisiana, the state government insisted International's Louisiana income was subject to the state income tax.

Home or "Office"?—A point yet to be settled is whether or not a

salesman who writes his reports in his home can be considered to have an "office" in his home.

During Congressional debate on the new law, there was talk of fixing a termination date, after which states could presumably return to their former taxing practices. But no termination date is mentioned in the final version of the bill that has now become law.

All firms will have to continue paying taxes in their home states and in states where they maintain property.

Depreciation Talks

A long-awaited Congressional look at the problems resulting from antiquated and unrealistic Federal depreciation rules now is set for Nov. 30.

The tax-writing House Ways and Means Committee has named 11 leading tax authorities to join in a panel discussion on depreciation problems on that date. The depreciation discussion is one of a series of similar panels on tax problems that will extend over a five-week period beginning Nov. 16.

Chairman Wilbur D. Mills, D., Ark., of the Ways and Means Committee, emphasizes that the discussions are not hearings, as the committee has no formal bill before it.

Instead, he hopes the talks over the five-week period will provide the committee with a substantial volume of proven data that will enable the committee to write some meaningful depreciation sections into the internal revenue codes.

Freight Rates OK'd

Competitive setting of interstate freight rates may become a simpler job in the future.

Language written into the Interstate Commerce Act last year to provide more rate-setting flexibility has been used for the first time. This language, essentially, prohibits the denial of rate reductions for the sole purpose of protecting competing transporters. It allows the endorsement of rates that yield a small margin above out-of-pocket costs.

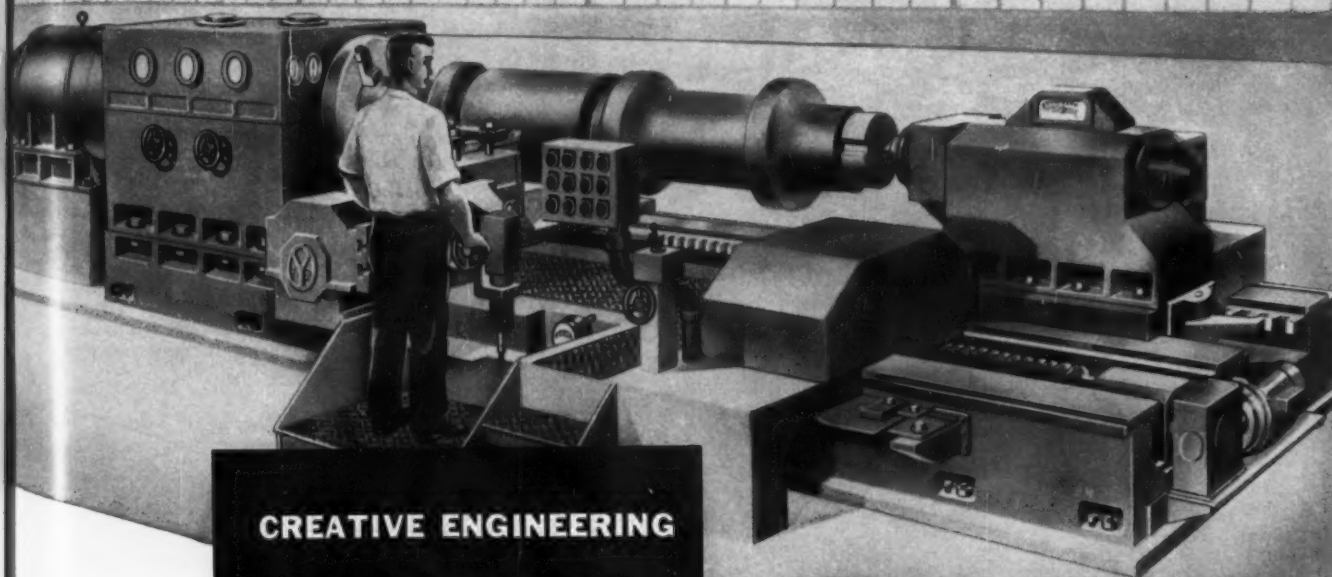
Eastern railroads had asked the Interstate Commerce Commission for authority to cut rates on carloads of paint and related articles. The proposed reductions were intended to stop the loss of traffic to competing carriers, chiefly truckers. Now the ICC finds the new rates reasonable and will allow them to go into effect on Oct. 31.

Tool Prices Lowered

Price reductions on Carmet Mining Tools, effective immediately, were announced by Carmet, the carbide producing facility of Allegheny Ludlum Steel Corp.

Prices on drill bits have been reduced 20 pct in 500 quantities and 25 pct in 1500 lots. Machine bits are 4 pct lower in 5000 quantities and 10 pct on 10,000 lots.

New price list can be obtained from Carmet Div., Allegheny Ludlum Steel Corp., 1500 Jarvis St., Detroit 20, Mich.



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Dr. Morton Hamermesh

A Leader in Nuclear Research

At 43, Dr. Morton Hamermesh is a long-term veteran in the relatively new field of nuclear physics.

His experiments have cleared the way for reconsideration of present physical theories.

■ In the relatively new field of nuclear physics, Dr. Morton Hamermesh, new director of the Physics Division of the Argonne National Laboratory, is a long-term veteran.

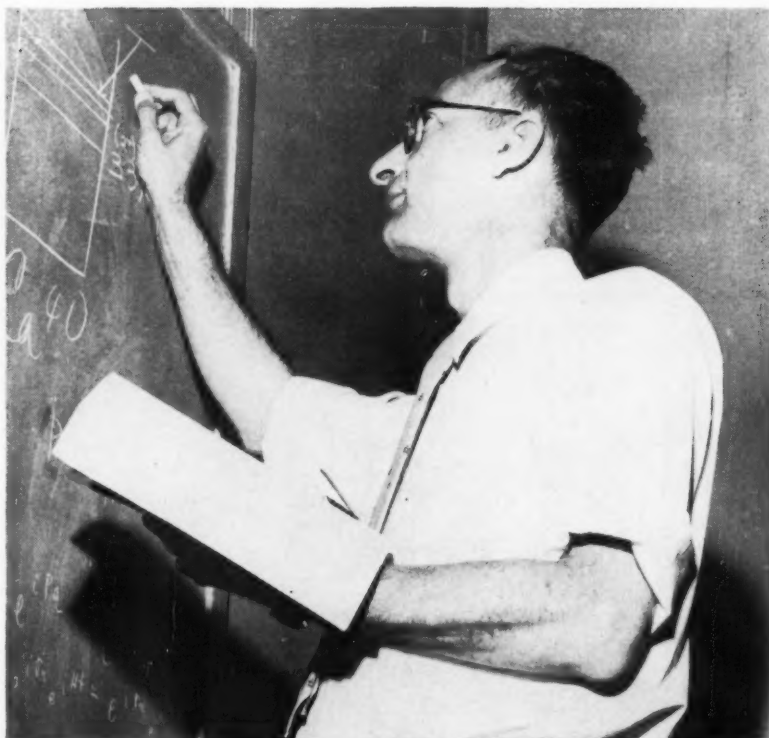
Backed by 20 years experience in nuclear physics, the 43-year-old scientist has made outstanding contributions to the field of polarization and scattering. His first was the development of a "filtering" system of a neutron beam that eliminated unwanted radiation.

New Look at Theories — This, and other experiments have cleared the way for a reconsideration of some current physical theories.

Dr. Hamermesh joined Argonne Laboratory in 1948 as a senior physicist. In 1951 he became associate director of the Physics Division, a post he held until being named director last June.

Physics Professor — Before joining Argonne he was associate professor of physics at New York University, teaching graduate courses in electrodynamics and nuclear physics. During 1943 and 1945 he was a research associate in the Office of Scientific Research and Development, Radio Research Laboratory, at Harvard University. The work, most of which is still classified, concerned the design of devices to jam enemy radar. With his associate, Dr. Eugene Fubini, he received a U. S. patent on a search antenna.

Earlier, he was a physics instruc-



DR. MORTON HAMERMESH: His experiments led to new discoveries.

tor at Stanford University. He also did basic research in physics under a contract between Stanford and the war-time Metallurgical Laboratory at the University of Chicago. The Met Lab preceded the present Argonne National Laboratory.

Russian Expert—Dr. Hamermesh is also an expert on scientific Russian and has translated a volume on classified theory of fields from that language. He serves on the American Institute of Physics Advisory Committee on Russian Translations. At Argonne he teaches scientific Russian to other workers and has organized a television course in Russian.

Recently, he returned from Switzerland after doing nine months of

research for his new book on mathematical theories and their relationships to basic research problems in physics. The title of the volume is "Group Theory as Applied to Quantum-Mechanical Problems."

He is a fellow of the American Physical Society, and a member of the Argonne chapter of the Scientific Research Society of America.

Sports Fan—At home, when he's not working physics problems, he becomes a TV fan. Ice hockey and boxing are his favorites, but he takes his vacation from the lab at World Series time so he can stay home and watch the ball games in his living room.

A family man, Dr. Hamermesh lives in Villa Park, Ill.

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How Spending Pattern Changes

Some spending influences will grow, others will taper off as the boom develops.

Capital spending and consumer demand will be important factors from now on.

■ You can look for shifts in emphasis as the present boom develops.

Some spending influences will become more important, others less so. Two of the major factors in shaking off the recession were inventory rebuilding and government spending. They were responsible for much of the increase in industrial and total output.

Less Incentive—In the months ahead, these areas of demand will probably stabilize or taper off. Following the large-scale buildup in inventories after the recession, there will be less interest in further stockpiling.

Evidence supporting this trend is already showing up. Total business inventories (on a seasonally adjusted basis) did increase by \$500 million during July, the Dept. of Commerce reports. However, this rise was only a little more than half the average monthly accumulation of \$900 million during the second quarter.

Purchasing Restraint—In addition, most of the July gain was at the wholesale and retail level. The greatest increases in inventories were made by retail automotive dealers and wholesale distributors of machinery and metals.

Industrial buyers can be expected to restrain their buying from now on. The latest business survey by the National Assn. of Purchasing Agents shows buyers hesitate to

take on any kind of a major inventory build-up.

"There is no evidence," says the NAPA, "that strikes, temporary shortages, or the influx of lower-priced imports have made any change in this policy. Better inventory control seems to be the order of the day."

Steel Is Exception—Running counter to the trend, however, will be a large post-strike buildup in steel inventories. Right now steel supplies are estimated at about 14 million tons, declining at the rate of

1.2 million tons a week. When the shutdown ends, buyers are expected to rebuild inventories to a 20 million-ton level.

New drives will take over the job of powering the boom from now on. Much of the steam will come from increased capital spending and greater consumer demand.

As is usually the case, industrial programs of modernization and expansion followed the general recovery by about six months. Between the first and second quarters this year, industry boosted its spending plans by about \$2 billion.

Stable Prices Are Possible

■ Continually rising price levels are not the normal pattern for the U. S. And reasonable price stability is possible with "vigilant and vigorous" public policies to control inflation.

These observations are made in the second part of the President's Cabinet Committee on Price Stability for Economic Growth. Tracing price levels through U. S. history, the reports shows one striking change in recent years: Wartime price rises have become permanent.

Disappearing Trends—As a rule, most war periods have brought rapid increases in price. But in the following years of peace, the price level usually has declined. Prices returned to about the pre-war level in 10 to 20 years.

But this trend has been absent in the fourteen years since World War II and in the five years since the Korean conflict.

Another tendency — declining prices during recessions — is also

disappearing. In only one of the four recent business turndowns (that of 1948-50) did consumer prices show any substantial decline. Therefore, the increases during periods of expansion have been accumulating without later rollbacks.

Industry Will Boost Capital Spending

Industry is putting greater push behind its spending for new plants and equipment.

Spending outlays for the second half of this year show upward revision from surveys made three months ago, according to the Securities and Exchange Commission and the Department of Commerce.

During the third quarter, capital spending is expected to total (on a seasonally adjusted annual rate) \$34.3 billion. This is a rise from the \$30.6 billion of the first quarter and the \$32.5 billion of the second quarter.

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Then, too, location can affect labor costs. Employees in this six-state area have high productivity, low absenteeism records. Labor turnover is low, too. Other advantages in the states served by the N&W include ample water from six major rivers and underground sources . . . reasonable building costs . . . ample low-cost electric power . . . and good living for personnel.

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A data processing system can tell you what is happening to your sales and profit dollars.

It pinpoints both strength and weakness in your salesmen, your areas and your products.

■ Data processing is a useful addition to nearly any accounting department. It can handle mountains of work with very little effort, bringing speed, efficiency and orderliness

to accounting procedures.

But its usefulness shouldn't stop there. It can provide much other valuable data to aid management.

Originally conceived as a means of improving accounting procedures, a data processing system has given L. B. Foster Co., Pittsburgh, a method of managing its entire marketing operation. The help given management in evaluating sales and profit performance and potential is now considered the major achieve-

ment of the system. Lower cost of accounting is almost incidental.

Steel Warehouse—The company had built an 8-figure business prior to 1955 as a warehouse of rail and track accessories, steel sheet, piling and other steel products for heavy construction and highway building.

Expansion and Diversification—A 1955 plan for more rapid expansion, which has since boosted sales 250 pct, created a sales man-

agement problem. The company also began diversifying in many different directions. Two examples: Moving into fabrication of highway products such as aluminum bridge rail; broadening rail and track accessory lines to include additional railroad maintenance-of-way items.

With a 48 pct sales increase in 1955, central management found it more difficult to evaluate operations with the data available. Sales in the three major product lines and overall profits were known only after the accounting department had prepared six-month and annual statements—60 to 90 days after the period ended.

Gives The Answers—In investigating a data processing system to reduce accounting department paperwork, a solution was found to the sales management problem. Today, the company knows to the last dollar exactly what is happening to sales and profits for each office, product, state, market, customer and salesman as often as management deems necessary.

This information is used in sales

Modern Marketing Fourth of a Series

SERIES ENDS: This is the last of a four-part series. Previous articles covered budgeting a salesman's time, new product introduction and coding of customer-prospect lists.

supervision, market planning (including advertising), product development, inventory control, cash utilization, etc. In short, no management decision is made without first taking into account the processed data.

Greatest Advantage—The system is simple but comprehensive. Every essential business transaction is put "on tab." Information may be processed and fed back to management in as little or as great detail and with whatever correlations desired.

Foster considers the greatest advantage of the system is that it has

enabled the company to grow without changing basic methods of operation. Each branch is responsible for completely integrated operations including sales, buying, stocking and service. Central management coordinates the whole, reviews performance and makes policy and suggestions accordingly.

Cards Tell Story—Data processing machines used are the standard punched card equipment used for accounting purposes. In designing the cards, Foster also redesigned order forms, invoices, purchase orders, etc., so that it would be possible to describe fully the customer or vendor and the transaction.

Because each card is complete, reports are comprehensive. New reports involving new correlations may be prepared without revisions of the system.

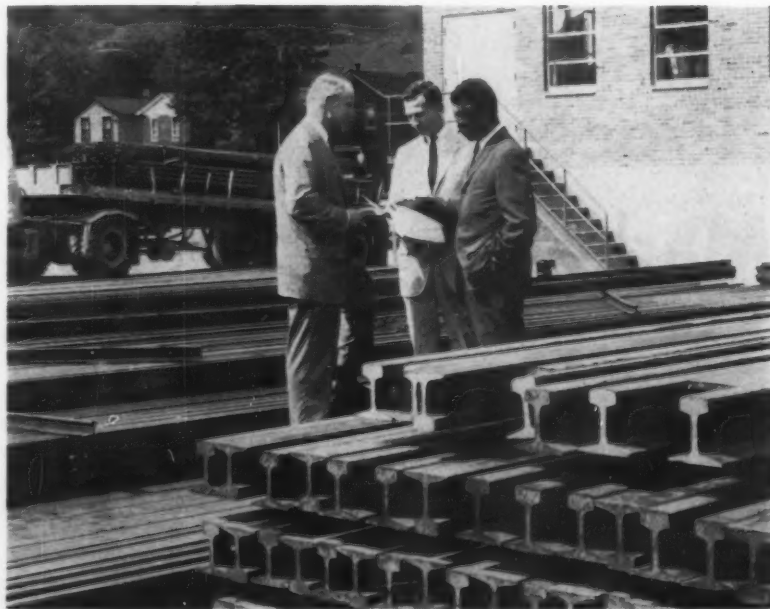
Reports Summarized—If the company's data processing differs in techniques from others, it is in that all items for certain reports are first printed in full. This same information is subsequently summarized by sales office and the dozen major product classifications to give management a quicker recap of current operations.

The encyclopedic report is most useful to branch managers and their sales managers. Should a summary report show that sales or profit in a particular line appear lower than expected, or lower than in other offices, the reason is sure to be found in the recap of individual sales.

Profits Affected—This same report highlights an easily forgotten fact of business life: Every transaction affects profitability. Use of the report has greatly improved administrative procedures in branch offices.

Reports for Management—Two summary sales and gross profit reports are used by management. The first is a quick recap primarily useful in evaluating current business operations in general. In addition

Reports Are Valuable in the Field



FIELD OPERATIONS: Checking rail inventory against the monthly inventory report are (l to r), Donald Middleton, Pittsburgh branch sales manager; J. L. Foster, vice president; and B. S. Mars, vice president and general manager-Pittsburgh branch operations.

to the previous month, it gives figures for the year to date and comparative figures for previous year.

The second report provides a summary of 93 major products. Since product mix is important, this report tells the company where to concentrate sales and advertising efforts by pinpointing weak and strong spots. It also aids in predicting inventory needs.

Analyze Markets—Since Foster's inventory goal is a four-times a year turnover, the report itself, plus management interpretation to take into account seasonal and economic forecasting factors, evaluates inventory control performance.

Two other reports analyze potential markets. One analyzes sales by states and the other by 43 customer classifications. These reports help in planning sales force expansion. Figures are compared with various indexes and marketing figures for the areas and industries involved to determine where sales and advertising efforts will have the greatest payoff.

Aid From IRON AGE—One of the more concise efforts to pinpoint markets involved use of structural pipe in fabrication. For this analysis Foster used The IRON AGE master list of plants in metalworking. This carries every metalworking plant in the country on a punched card, giving its size and the principal product manufactured (Standard Industrial Classification Code).

Speeds New Facilities—One typical figure resulting from use of these cards: The company discovered in Ohio it was selling one industry only half as much of one item as it should have been, based on sales in neighboring Western Pennsylvania. A resident sales office and a new local warehouse, planned for Cleveland, were established ahead of time as a result.

In 1958 this pinpointing of the market paid off big for Foster. Despite an overall decline in the industries served by Foster, company sales actually increased in 21 states. This was because the com-

Data Processing Is Versatile



AMAZING MAZE: Flexibility and easy changeover for different types of jobs are features of data processing equipment.

pany spent greater effort in the states where it had not been getting its normal share of the market.

Set Real Sales Goals—Pinpointing sales by state and industry, and comparing this information with data such as The IRON AGE master list of metalworking plants, permits establishment of realistic sales goals based on the whole market rather than simply on experience.

Sales by individual salesmen are also brought out in detail. This provides an effective tool for sales management in the local branch offices.

Customers and Products—Data processing has also been useful in the expansion of the company's product lines. Management has a quick report on the success of each new item. This information has been used to pace introduction of related products and to expand the marketing of a product from one region to another.

Controls Expenses—The system is used to control expenses as closely as it supervises sales. Again, a series of reports are printed. The first details items fully and subsequent reports summarize them for management. For close control

over operations, every item—even the cost of preparing each data processing report—is detailed in the encyclopedic report and included in the summaries.

Stock lists are made up monthly for each item that Foster handles. The primary purpose of this report is to let all the offices know what the others have in stock.

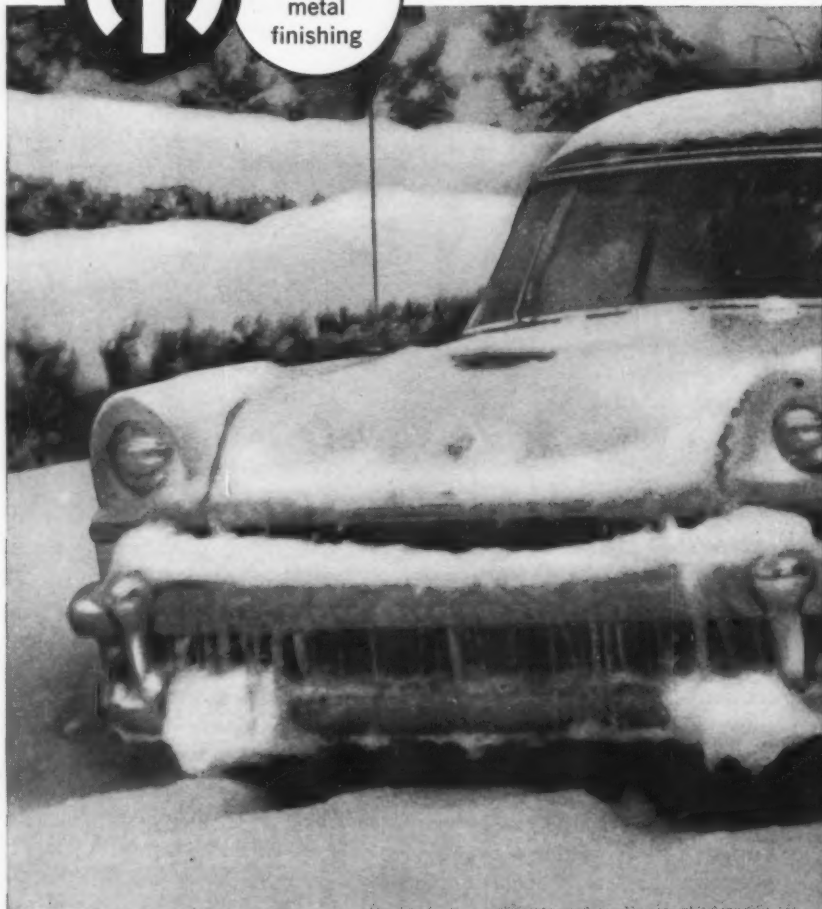
Mailing Piece—The stock list of pipe is printed as a mailing piece to customers. As sales in this field depend to a large extent on fast delivery, the monthly stock list is a very helpful selling technique.

Another supplementary report totals tonnage moved into and out of each warehouse (invoices and vouchers include weight which is coded on the punched cards). These figures help warehouse managers determine employment requirements and have in some cases prompted changes in handling techniques.

Reprints of this and the other articles in this series are available as long as supplies last. Write Reader Service Dept., The IRON AGE, 56 & Chestnut Sts., Philadelphia 39, Pa.



What M&T
is doing in
metal
finishing



Brightwork
can
stay
bright
now . . .

New M&T Chromium Plating Discovery offers most economical way to improve durability

Durability of chromium plated parts in severe, accelerated corrosion tests has been increased up to 500% by the revolutionary Unichrome "Duplex Chromium" Plating Process developed by Metal & Thermit.

Using M&T "Duplex Chromium" to increase the thickness of chromium approximately five times from the usual average of 10 millionths of an inch enables parts to maintain an ASTM durability rating of 8 or better (10 is *perfect*)! This thicker and more uniform chromium plate radically increases survival time in modern accelerated tests by many times over.

M&T "Duplex Chromium" consists of a layer of Unichrome Crack-Free Chromium which blocks infiltration of corrosives to underlying metal. It is followed by another layer of Unichrome SRHS® Chromium to build up proper thickness. The additional millionths of an inch more chromium, in these two layers, do more for outdoor durability than any

other change in present plating procedure. Results show that per dollar invested in equipment and solutions, this new technique gives greater benefits than a corresponding expenditure for thicker copper and nickel undercoats. It saves on capital investment because existing production equipment can be used. It saves by cutting rejects of parts which are now required to survive more rigorous life tests than heretofore.

Simply by adding the few additional minutes to plating time and using M&T "Duplex Chromium", you can add *years* to the life of chromium plated finishes in outdoor exposure. Send for data. Or ask the M&T Man about it.

METAL & THERMIT
CORPORATION

GENERAL OFFICES: RAHWAY, NEW JERSEY

Corvair List Price: \$1810 Up

But Add Taxes, Delivery, Handling, and Extras

Corvair will come out in two series. But lowest price coupes won't be out until Jan. 1.

The GM division hopes to sell 300,000 next year, plus 1.5 million standard cars, a new record.—By A. E. Fleming.

■ Standard-sized models were almost forgotten last week at the Chevrolet press preview. They were completely obscured by interest in the new, light Corvair which will go on sale Oct. 2

General Manager E. N. Cole disclosed that the much-photographed car (IRON AGE, Sept. 3) will range in price from \$1810 to \$1920. These are the manufacturer's suggested list prices, and do not include Federal, state or local taxes, or delivery and handling charges.

Model Plans—This means that the list price for the lowest priced model is about \$225 less than any Chevrolet now offered. However, the bottom car in the price ladder won't be available until after the first of next year.

Corvair will be offered in two series—the "500" and "700"—with two models in each. Initially, however, only one model in each series will be available—a four-door sedan. A two-door coupe will be available in January. Mr. Cole also said Chevy will add a rear-engine stationwagon to the line, but didn't say when. There are no plans for a convertible model.

Price Details—List price for the "500" series four-door sedan is \$1860. For the same model in the

"700" series, it is \$1920. However, the lowest price models in each series are the two-door coupes, \$1810 for the "500" and \$1870 for the "700". These are the models that won't be offered until January.

Prospective buyers shouldn't expect to land one of the small cars for less than \$2000. Federal excise taxes will add 10 pct, or about \$181, to the price of the least expensive model. Dealer handling and make-ready charges (for seeing to it that the car is clean and in

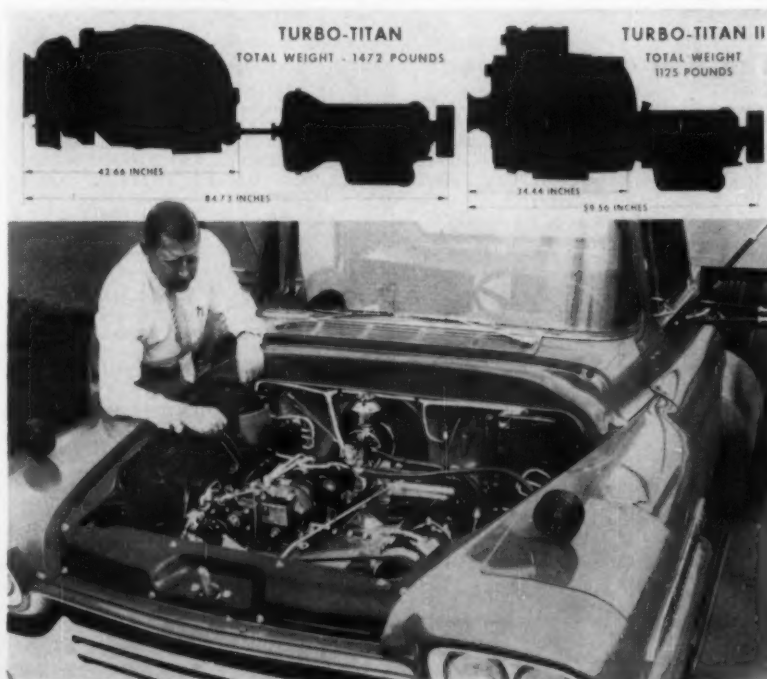
order when delivered to the customer) usually amount to \$35 to \$50.

Transportation costs, title and license fees, and optional equipment will up the price further.

An automatic transmission, for example, has a factory list price of \$135.

Trade-In Factor—Nor can buyers expect allowances for their old car to be as liberal. According to reliable reports, the dealer mark-up on small cars has been reduced to

New Experimental Gas Turbine Engine



JET POWERED: Chevrolet's latest experimental truck, Turbo-Titan II, is powered by a new 225 hp gas turbine engine. The engine is 350 lb lighter, 25 in. shorter, and uses 25 pct less fuel than Chevrolet's first turbine-powered truck, Turbo-Titan I.

20 pct (the same as for imported cars), compared with 24 pct for full-size vehicles. And if the new small cars sell well, there'll be less dickering by dealers.

Chevrolet began Corvair production on July 6 at its Willow Run, Mich., assembly plant. Recently, production was started up at Kansas City, Mo., and Oakland, Calif.

30,000 by Oct. 2—Up to Sept. 10, some 16,000 Corvairs had been produced, according to Mr. Cole. He said Chevy expects to have 30,000 units by the Oct. 2 introduction date. Advance orders from dealers were placed at 15,000 units with a total of 50,000 orders expected by the time the new cars are shown to the public.

At the same time, Mr. Cole forecast Chevrolet would sell 300,000 Corvairs in the next year—plus 1.5 million standard cars and 365,000 trucks. If his prediction proves correct, Chevrolet will top its previous total sales record set in 1955 by about 100,000 units.

S-P Adds 2 Models To 1960 Lark Line

Holding firm to its promise not to make changes for the sake of obsolescence, Studebaker-Packards 1960 model Larks look just the same as its money-making 1959 line.

But the length of the line has been extended with the addition of a four-door stationwagon and a convertible. At the same time, S-P is making V8 engines available as an option in its lower-price series.

Harold Churchill, president, says the company expects to increase its share of the auto market to 3 pct from about 2.5 pct this year. In 1958, the company claimed less than 1 pct of U. S. auto sales.

Sales Target—At the same time, the company is shooting for unit sales of about 180,000 in the 1960 model year, compared with a 1959 showing of 131,500. However, Mr. Churchill indicated that this wasn't the limit of S-P's ambitions: "While this step-up should be well within

Automotive Production

WEEK ENDING	CARS	TRUCKS
Sept. 12, 1959*	21,722	13,550
Sept. 5, 1959	17,261	15,433
Sept. 13, 1958	24,072	6,876
Sept. 6, 1958	12,314	4,484
TO DATE 1959	4,112,350	849,439
TO DATE 1958	2,780,041	573,364

*Preliminary

Source: Ward's Reports

our reach, we shall be shooting continuously beyond that mark."

Company executives indicated that price increases, if any, for 1960 models would be small and that Lark models would be priced competitively with the new small cars to be introduced by the Big Three.

No Brand Loyalty—The company is also banking on the fact that the new small cars will be just that—new—while the Lark has had a year's head start in establishing buyer acceptance. At the same time, executives point out that the new small cars can't count on "brand loyalty." They believe prospective small-car buyers will look at all of the small cars before they buy.

And Lark, they note, has a full line of smaller cars—including the only convertible among domestic cars, plus offering both six-cylinder and V8 engines in all models. Meanwhile, the new entries will offer only a few models to start, with stationwagons not due until next year.

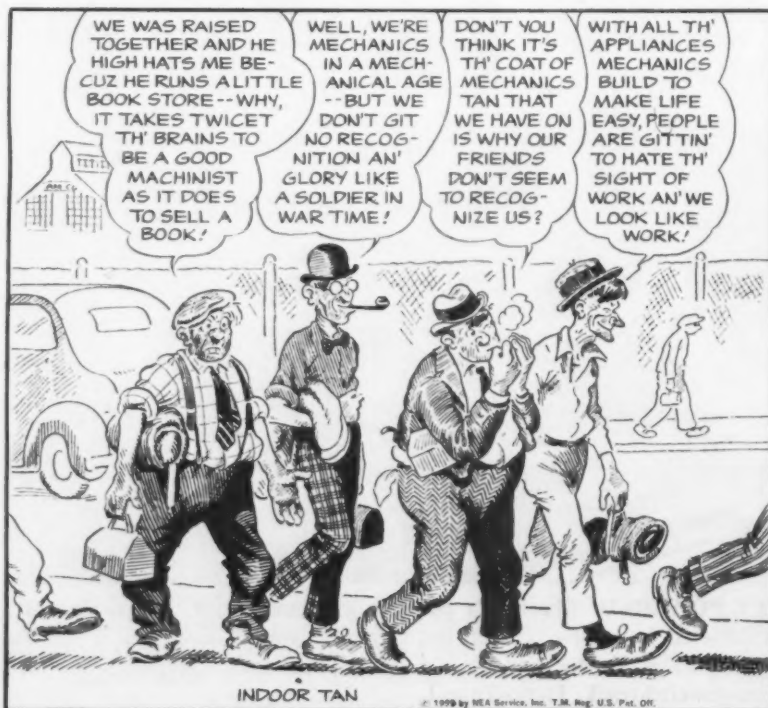
Rename Dodge Series

The new 118 in. Dodge Dart will be marketed in three series: Seneca, the most economical line; Pioneer, the practical price series; and Phoenix, the higher styled series.

The three groups will compete directly with Ford, Chevrolet and Plymouth.

The bigger 122 in. wheelbase Dodge line will come in two series, the Matador and Polara. These names will replace the three Dodge lines of previous years, the Cornet, Royal and Custom Royal.

The Bull of the Woods



COMPARE THE NEW

EIMCO 123

FRONT END LOADER!

CHECK THE

FACTS

NOT THE CLAIMS

	EIMCO 103	CAT D-4	CAT D-6	AC HD-6	AC HD-11	INT. TD-9	INT. TD-18	CASE 1000
Maximum Drawbar Pull, Pounds (zero track slippage)	33,600	19,700	19,000	15,485	21,980	13,240	23,730	24,000
Torque Converter	Yes	No	No	No	No	No	No	Yes
Master Clutch	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Power shift transmission on all speeds, with oil-cooled metallic clutches that never need adjustment	Yes	No	No	No	No	No	No	No
Independently reversible track	Yes	No	No	No	No	No	No	Yes
Hydraulic track take-up	Yes	No	No	No	No	No	No	Yes
Heat-treated alloy steel grouser shoes, keyed to the track links	Yes	No	No	No	No	No	No	No
One-piece heat-treated alloy steel track rollers, tapered roller bearings	Yes	No	No	No	No	No	No	No
Equalizer bar of heavy duty heat-treated cast alloy steel, allowing full oscillation of crawler tracks with all attachments	Yes	No	No	No	No	No	No	No
Constantly running power take-off drives, front and rear, to standard SAE spec, with rear take-off not affected by track operation, and independent hydraulic pump drive allowing simultaneous use of hydraulic, winch and hoist accessories	Yes	No	No	No	No	No	No	No
Front operator's seat for full visibility	Yes	No	No	No	No	No	No	No
Ability to operate forward and backward on up to 50% slopes	Yes	No	No	No	No	No	No	No
Tractor guaranteed for one full year of single shift service	Yes	No	No	No	No	No	No	No



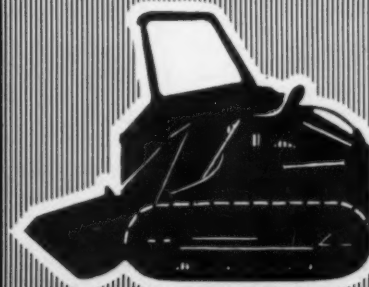
FOR PROOF OF
EIMCO

123

SUPERIORITY

FRONT END LOADERS	EIMCO 123	CAT 955	CAT 977	AC HD-6G	AC HD-11G	INT. 9K3	INT. 15K3	CASE 1000
WEIGHT, POUNDS	25,000	22,470	34,915	19,600	32,000	19,985	33,235	21,800
BUCKET, CU. YARDS	1 1/2	1.1	1.8	1 1/2	2 1/2	1 1/2	2 1/2	N.A.
ENGINE HP	100	70	100	72	111	71	113	100
TRACK GAUGE, INCHES	60	60	74	60	74	60	74	60
SHOE WIDTH, INCHES	17	15	18	13	16	15	18	16
LENGTH OF TRACK, INCHES	88	81 1/2	105 1/2	83 1/2	106 1/2	75	98 1/2	79
TRACK AREA, SQ. INCHES	3,000	2,450	3,814	2,180	3,410	2,250	3,546	2,530
GROUND PRESSURE, PSI	8.3	9.2	9.2	9.0	9.4	8.9	9.4	8.6
LIFT HEIGHT TO HINGE PIN, INCHES	144	128	144	120	139	125	144	134
BUMP HEIGHT, INCHES	115	100	114	96	114	102	113	101
BUMP REACH, INCHES	44	38 1/2	39	31	37	26	37	40
MAX. DUMP ANGLE, DEGREES	63	50	50	45	52	60	58	50
MAX. PUMP PRESSURE, PSI	1,200	1,450	1,450	1,000	1,200	1,500	1,750	1,450
PUMP, GPM	75	43	52.5	39	72	N.A.	N.A.	50
LIFT TIME, SEC.	7.5	7.0	9.1	9.0	9.0	7.7	9.0	7.5
BUMP TIME, SEC.	3.0	4.0	5.0	4.0	4.0	N.A.	N.A.	1.6
GROUND CLEARANCE, INCHES	17	13 1/2	19 1/2	11 1/2	13 1/2	9	10	16

N.A. — not available



Information is from manufacturer's data and other sources believed to be reliable, but cannot be guaranteed.

IT'S A FACT . . . not a claim . . . that here is a MODERN line of tractors that makes all other crawler-tractors old-fashioned!

Other exclusive features includes Unitized "Stress Flow" Construction, for far greater strength and rigidity; Self-cleaning Air Cleaner that completely eliminates ordinary routine cleaner maintenance and others, far too numerous to list here. Write for details and specifications on all the advanced engineering features of the modern Eimco 103 line of crawler tractors.

AVAILABLE IN
FOLLOWING MODELS:

103 — TRACTOR AND DOZER
123 — FRONT END LOADER
133 — STEEL MILL FEL
143 — LOG LOADER

THE EIMCO CORPORATION

EXPORT OFFICE: 81 - 83 SOUTH STREET, NEW YORK, N. Y.

DEALERS AND RENTERS IN ALL MAJOR COUNTRIES



TRACTOR LOADER
DIVISION

634 SOUTH 4TH WEST
SALT LAKE CITY, UTAH — U.S.A.

B-454

going places...

Designed to handle heavy duty applications, CIMPERIAL is the new chemical cutting fluid that has already won nation-wide acceptance. Wherever used, CIMPERIAL scores new production records, particularly on low clearance, low speed, heavy cut jobs—previously limited to cutting oils.

SALES REPORT

2

a sub-contract making cone exits for missiles.

A 17-inch pass to bore a taper inside the cone (normalized 4130 steel). 5/8" of metal to be removed.

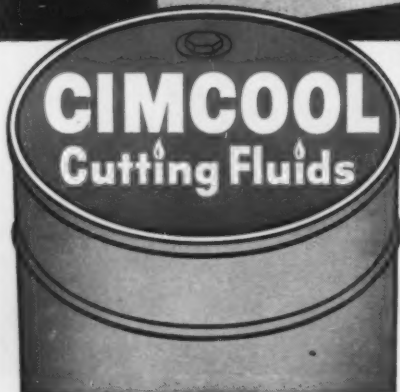
With the former coolant it took 7 passes and they needed a new tool bit each time.

They put in Cimperial (at 1:15 dilution). Now it takes only 3 passes—all with the same tool.

Work piece is much cooler, even with bigger cut. Chatter eliminated entirely. Production more than doubled and tools last 7 times as long, with Cimperial. It really pulled them* out of a hole on deliveries.

Bill Crawford
Los Angeles Office

*Firm name available on request.



FOR 100% OF ALL METAL CUTTING JOBS
Production-proved products of The Cincinnati Milling Machine Co.

CIMPERIAL—newest in the famous, industry-proven line of CIMCOOL® Cutting Fluids!
CIMCOOL 52 Concentrate—The pink fluid which covers 85% of all metal cutting jobs.
CIMPLUS—The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, SS)—For every job requiring an oil-base cutting fluid.
ALSO—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

For full information on the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

*Trade Mark Reg. U.S. Pat. Off.

What Labor Thinks of Reform

Threats of reprisals against Congressmen who voted for labor reform have cost labor some friends.

Union leaders reluctantly admit they can live with the law.—By G. H. Baker.

■ Union leaders are overplaying their hands in their denunciations of those who stood up for labor reform this year. There is already clear-cut evidence within Congress that their threats ("we'll get you") are alienating some of their friends.

Also, nearly everybody realizes that the new reform law is not a "killer law," as the AFL-CIO says it is, any more than the Taft-Hartley law was, as union heads claimed on enactment in 1947, a "slave labor law."

Union Gains—Since 1947, nearly every labor union in the United States has gained in members, in prestige, and in financial health. Only a handful of plainly Com-

munist-dominated unions have lost ground since Taft-Hartley was enacted. Important unions such as the United Steelworkers and the United Autoworkers have enjoyed peak prosperity and prestige in the past 12 years.

True, union leaders are particularly bitter against the provisions in the new law that prohibit secondary boycotts and coercive picketing designed to force a union on unwilling or disinterested employees. (This will slow the growth of unions in the South.) But leaders in the labor movement admit they "can live with" these restrictions. The main objection to these prohibitions is that they will slow up the unionization of new industries and of employers acting as subcontractors to larger unionized prime contractors.

For Some — Something New—Honest unions have nothing to fear from the sections of the new law requiring honest elections. Unions such as the United Steelworkers have long held honest elections and

have permitted rank-and-file members to have their say on union policy matters.

The new law says elections must be held by internationals at least every five years and by locals at least every three years. And the ballots must be counted. The totals can no longer be "estimated," as has been the practice in certain unions. Independent poll-watchers must be on hand and neither employer funds nor union funds may be used to promote any candidate.

Labor Law May Take Years to Interpret

A leading labor lawyer says some provisions in the new labor reform law will take years to interpret.

Archibald Cox, a Harvard professor and labor adviser to Senator John F. Kennedy, D., Mass., says the key issues of hot cargo, secondary boycotts, and blackmail picketing will have to be settled by the federal courts.

After All the Labor Bill Shouting—

Key Figures Are Happy



THEY DID THE WORK: Senators John L. McClellan and John Kennedy appear satisfied.

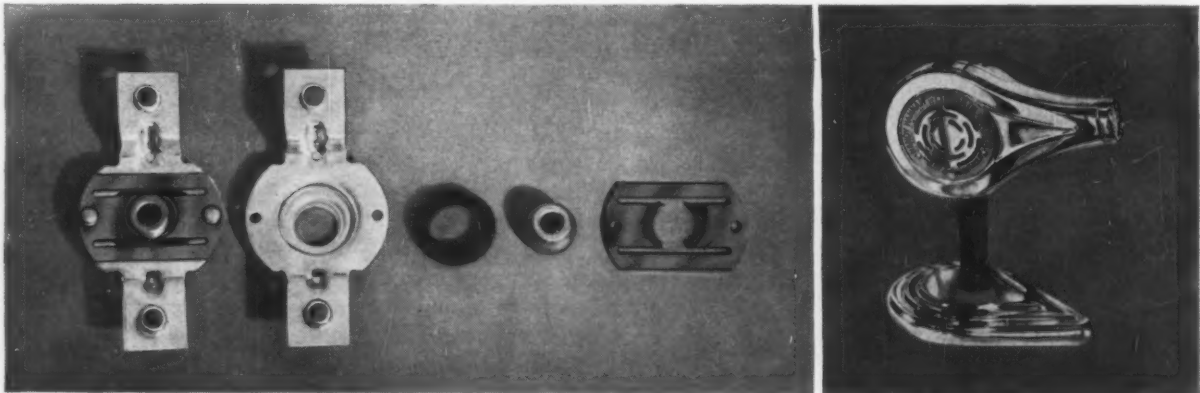
So Are Dissenters



THEY VOTED NO: Senators Wayne Morse and William Langer cast only Senate negative votes.

NEW BRONZE CAN CUT SPRING COSTS—

Superfine-grain phosphor bronze by Anaconda now handling many tough jobs, replacing costlier materials.



RETAINING CLIP for a bronze bearing in the Handy Hannah Hair Dryer was originally of spring steel. Rejections ran 20% in the stamping operation and another 20% at the assembly stage. The Handy Hannah Products Corp., Whitman, Mass., switched to

Duraflex, Anaconda superfine-grain phosphor bronze, found it had not only the spring quality and fatigue resistance needed for the job—but also had superior formability which eliminated rejections.

SPRING CLIP takes a steady beating as it holds invoices in place in imprinting machines—used widely in handling charge accounts by retail stores and service stations. In the imprinter (right) made by the Farrington Mfg. Co., Needham Heights, Mass., this clip was originally of beryllium copper. Hearing about the superior fatigue life and endurance limit of Duraflex, Farrington consulted Anaconda technical specialists and decided to try it. Duraflex has been doing the job now for two years, stands up in service, saves \$1.50 a pound in material cost.



TESTS by an independent laboratory show that design stresses for Duraflex wire and flat springs can be from 33% to 50% higher than for those made from regular phosphor bronze—yet Duraflex costs no more than regular phosphor bronze. Get the test reports and reevaluate all your components requiring spring properties. For copies of these reports or technical help in selecting the right alloy and temper, see your Anaconda representative. Or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 0045

DURAFLEX®

SUPERFINE-GRAIN PHOSPHOR BRONZE

A PRODUCT OF

ANACONDA®

Made by The American Brass Company

Salesman's Roadmap for Farwest

New Prospects Are Well Worth a Sales Call

Population gains keep expanding the Farwest market for consumer and industrial goods.

Here's latest rundown on companies there who are setting up shop or expanding existing plants.—By R. R. Kay.

■ The biggest news in southern California is the mass of persons moving in. They're coming at the rate of 1000 a day.

Right now, the 14-county southern California population is 9.4 million. It'll pass the 10 million mark during next year.

Sales Prospects—This all adds up to a bigger and bigger market for consumer and industrial goods.

Here are the companies either setting up shop or expanding their plants. If you are trying to increase sales a call might be worthwhile.

Bells, Floors, and Missiles—Bufnell Co., Ltd., Santa Fe Springs—metal floor grating. Continental Can Co., Los Angeles—containers. Lummis Manufacturing Co., Pasadena—service station signal bells and key reels.

Transicold Corp., Los Angeles—transport refrigeration and mobile air conditioning equipment. M. C. Gill Corp., South El Monte—metal honeycomb and sandwich panels. Beach Manufacturing Co., Compton—aircraft and missile parts.

Bird Cages and Trailers—Broderrick & Bascom Rope Co., Los Angeles—wire rope. Boles Aero, Inc., Burbank—trailer coaches and house trailers. Zumar Industries, Inc., Los Angeles—metal traffic and safety signs.

General Hoist & Equipment Co.,

Lynwood—cranes, hoists. U. S. Nuclear Corp., Burbank—shields, handlers for nuclear materials. Ferguson Wire Displays, Los Angeles—wire baskets, display racks.

Raco Engineering Service, Alhambra—welding positioners, foot controls. BMW Manufacturing Co., Inc., Torrance—machine shop. Pacific Cage and Screen Co., Inc., Los Angeles—bird cages, fireplace equipment.

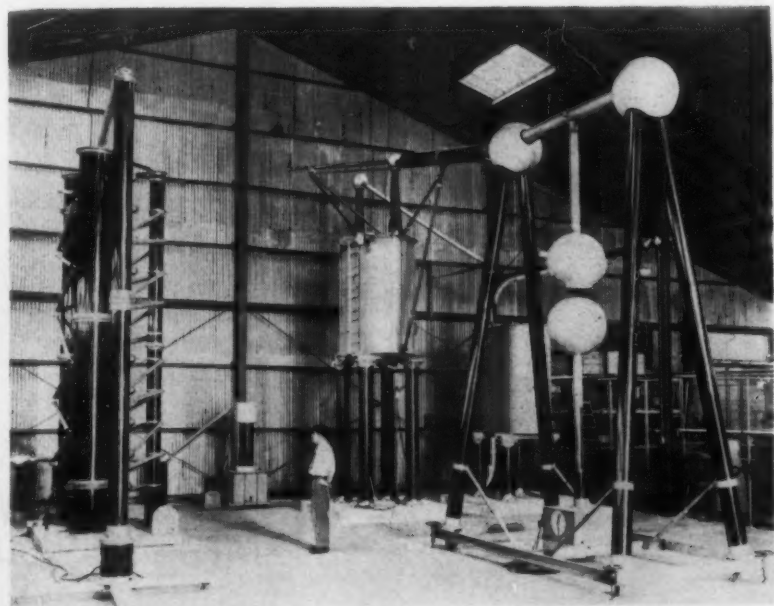
Aircraft and Auto Parts—Horky-Moore Associates, Torrance—aircraft and missile parts. Almond Automatic Equipment Co., Azusa—automatic auto laundry equipment. West Coast Chain Mfg. Co.,

Pasadena—chain. International Electronic Research Corp., Burbank—electronic equipment and instruments.

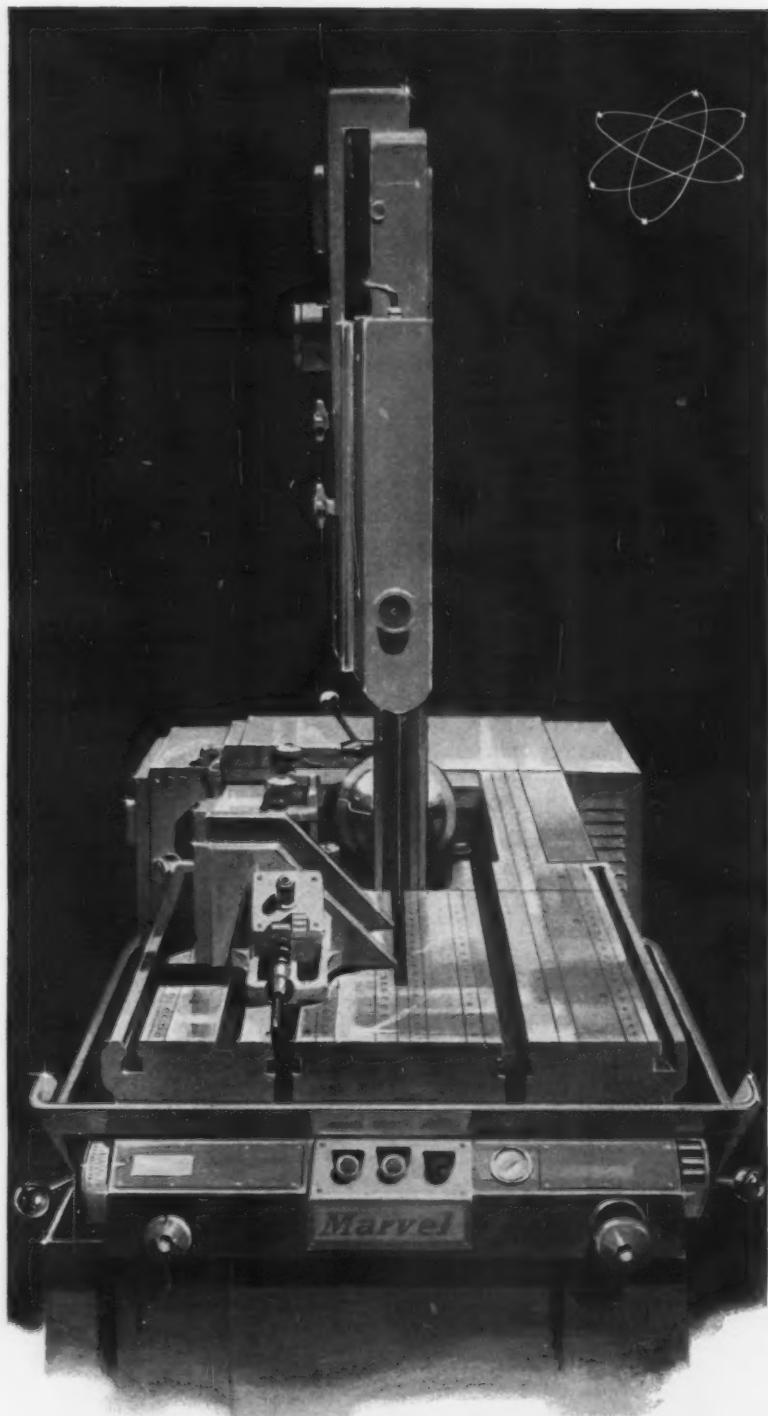
C. W. B. Machine Works, Los Angeles—printing press parts, special machinery. Ornamental Products Co., El Monte—auto accessories. Trimview Metal Products, Covina—aluminum building products. J & J Machine Shop, Los Angeles—prototype machine shop work. Le Fiell Mfg. Co., Santa Fe Springs—tubular metal products.

Spintek, Inc., North Hollywood—metal spinning. Construction Material Sales Operation, General Electric Co., Los Angeles—wire products. Stratoflex, Inc., Hawthorne, Calif.—metal hose.

Man-Made Lightning Ready for Use



SURGE TESTING TOOL: New high-voltage development laboratory at Kelman Power Circuit Breaker Div. of I-T-E Circuit Breaker Co. can test voltages as high as 1,500,000 volts. Installation is in Los Angeles.



A goal we set many years ago has been reached.

When MARVEL decided to produce a heavy duty production band sawing machine, we were determined to bring out the most advanced, the most efficient band saw that it would be possible to produce . . . regardless of the cost in research, invention, and truly "new" design.

We were not interested in producing a band saw that would be only "as good" or "equal", or even "similar" to other machines already on the market. The new MARVEL Band Saw would have to be a superior machine—years ahead in design and performance . . . and its design must solve problems that have constantly challenged band saw builders and users alike:

**Improve Band Sawing Accuracy . . .
Extend Band Blade Life . . . and
Reduce Cost Per Cut to the Minimum.**

The recent introduction of the MARVEL No. 81 Series Heavy Duty Universal Hydraulic Band Saw Machines, specifically designed for use with high speed steel band blades, and equipped with a MARVEL invention—the "Sure-Line" Automatic Blade Control*—is *THE* major technical development in metal band sawing during the 20th Century.

The MARVEL "Sure-Line" Automatic Blade Control is an electro-mechanical servo-mechanism that continuously senses and automatically corrects any tendency of a band blade to cut inaccurately. The "Sure-Line" unit literally "steers" the blade to make it cut in a straight line.

Because of this exclusive feature, MARVEL No. 81 Single Cut, and No. 81A Automatic Bar Feed Band saws are the only modern band sawing machines capable of fully utilizing all the advantages of high speed steel band blades. Heavier feed pressures and higher blade speeds can be safely applied with complete assurance that the accuracy of cut will not be impaired. This leads to much faster production.

For this—and many other reasons, the new MARVEL No. 81 Series Band Sawing Machines are literally *Tomorrow's Saws Today!* Why not write for full details now?

*BASIC PATENT APPLIED FOR

FROM MARVEL...

TOMORROW'S SAW TODAY!

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THE IRON AGE, September 17, 1959

Why Numerical Controls Gain

Savings Lead to Many New Developments

Smaller shops stand to gain from new adaptations of n-c to short run projects.

Earlier skepticism is fading as tooling economies start paying off.—By R. H. Eshelman.

▪ Look for a surge of new developments mating numerical controls with machine tools. Success of the multiple-tool idea, embodied in the Kearney & Trecker multi-matic, is spurring a scramble for new concepts.

Ones who stand to gain: Smaller shops who comprise the bulk of metalworking plants. Their production engineers say big transfer lines are virtually ruled out for their small-lot type of operations. But K-T can point to tooling economies where their concept pays off. It's the vast area between no tooling coupled with high labor costs and high volume specially tooled automation lines.

Fewer Skeptics—Such signs point to a new stage of acceptance of numerical controls. George S. Knopf, manager of industrial controls for Bendix Aviation Corp., tells *THE IRON AGE* that companies now looking at numerically controlled machine tools have thrown out any skepticism they had when it was first introduced.

He points out that because of experience gained in the past few years, there's much greater enthusiasm now for numerically controlled machines. He cites instances where savings of these systems have paid for the machine in one or two years. Sales of Bendix n-c systems are up over twice that of six months ago. And the significant thing is that

many recent orders are coming from sources other than the Dept. of Defense or aircraft plants.

New Ideas—Numerical control technology is in constant growth, Mr. Knopf affirms, with new systems and ideas being introduced at an increasing rate. "It is estimated," he says, "that in the mid '60's, approximately 40 to 50 pct of the dollar volume of the total machines sold will be numerically controlled."

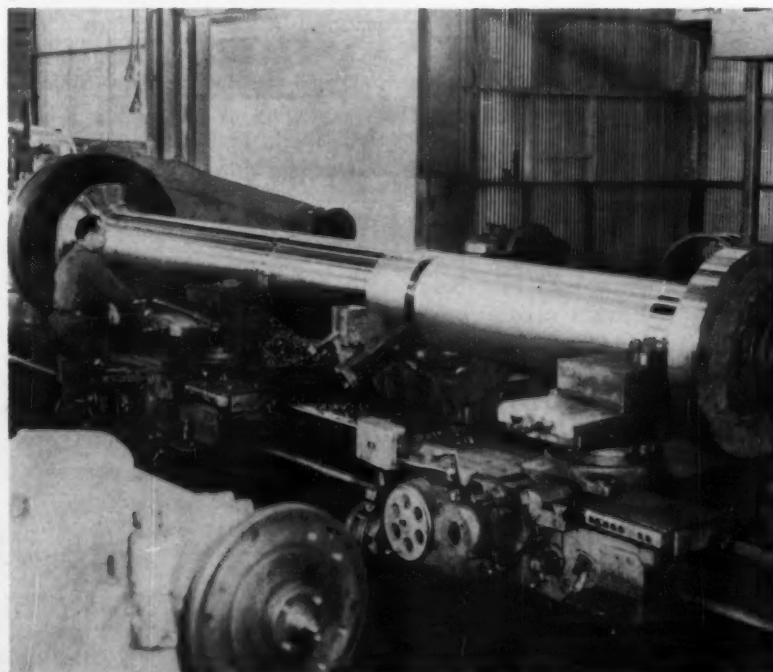
Mr. Knopf singles out some immediate areas where you can look for specific action in this n-c field, some very soon. These include,

among others, the machine tool industry itself. Others cited are the automotive; heavy earth moving; forming equipment industries.

Studies in all these areas show certain types of parts where n-c pays off well. For instance, it's learned that the Bendix plant in Detroit has been making sample parts for an automotive firm.

Market at Home—In the machine tool field—and some heavy equipment — numerical control will produce many parts cheaper from solid bar stock (or blank) that now are made as castings.

Waiting for the Tide



ONE OF FOURTEEN: Propeller shaft for American President Lines cargo ship is machined at Torrance, Calif., plant of National Supply Co. It is one of fourteen identical shafts, each 24½ ft long, for two new ships.

INDUSTRIAL BRIEFS

Sales to Soviet—Omni Products Corp., New York, will sell to the Soviet Union an American-made plant for production of plastic pipe. The pipe will be used for irrigation purposes. The New York exporting firm said that the deal had the full approval of the U. S. Dept. of Commerce and added it had received an export license before even entering negotiations with the Russian government.

Consultant Named—W. F. Allen, an official of the Pittsburgh Metallurgical Co., has been named consultant on ferroalloys to the Director, Iron and Steel Div., Business and Defense Services Administration, U. S. Dept. of Commerce.

Systems Contract—Dravo Corp., Pittsburgh, has been awarded a contract by Mesta Machine Co. to supply two Dravo-DeLaval mill lubrication systems for a new temper mill at U. S. Steel Corp.'s Gary, Ind., works. They will be installed on a 23-in. and 53-in. by 48-in. four-high, two-strand mill designed for maximum strip speed of 6000 ft per minute.

Iron and Steel Castings—Shipments of gray iron castings in June amounted to 1252 thousand short tons, 1 pct above shipments in May and 44 pct above June '58. During June, 85,000 tons of malleable iron castings were shipped, 2 pct above May shipments and 65 pct above June '58. Shipments of steel castings totaled 144,000 tons in June, 6 pct above May shipments and 55 pct above June '58, reports the Bureau of Census, U. S. Dept. of Commerce.

Russian Literature—A comprehensive Army study of recent Soviet literature pertaining to developments in the field of lubricants and lubrication to mid-1958 has been released to industry. Its title: "Lubricating Oils and Greases in the Soviet Union." (Order PB 151294 from OTS, U. S. Dept. of Commerce, Washington 25, D. C.)

Off the Press—Advantages of using aluminum forgings in all types of metal fabrication are presented in a new book, "Kaiser Aluminum Forgings — Product Information," just released. It can be obtained from the Technical Publications Dept., Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, Calif.

Low and High—Elliott Co., Jeannette, Pa., has developed a new line of centrifugal compressors for low-flow, high-pressure ratio applications. Available in single- and two-stage designs, they feature simplicity, flexibility in materials of construction, and adaptability to handling gases other than air.

Handbook Revised—A completely revised and improved edition of The Tool Engineers Handbook, compiled by the American Society of Tool Engineers, will be available Oct. 1. The second edition may be obtained from the ASTE, 10700 Puritan, Detroit.

Lightweight Guidance—A lightweight digital computer for the Achiever all-inertial guidance for TITAN will be developed by International Business Machines Corp. A contract for the computer was awarded to IBM's Federal Systems Div. facility at Owego, N. Y., by AC Spark Plug Div. of General Motors in Milwaukee.



"Welcome to our organization, Hoskins—I'm sure you'll be happy here—at first—"

Harbor Depot—Metron Steel Corp., Chicago, has established an import steel depot at the Calumet Harbor of Chicago. It will be operated there by the Calumet Harbor Terminals, Inc., serving steel warehouses, distributors, and manufacturers 12 months a year.

Division Data—Union Carbide Corp. has formed a new operating division to expand its consumer products business. It will be known as Union Carbide Consumer Products Co. Initially, it will market the Corporation's Prestone and Eveready brand products, previously handled by National Carbon Co., another division of Union Carbide.

New President—Dr. C. C. Long, director of research, St. Joseph Lead Co., has been elected president. The Metallurgical Society of the American Institute of Mining, Metallurgical, and Petroleum Engineers.

On the Road—A traveling display of industrial control devices is now touring the nation for Fulton Sylphon Div., Robertshaw-Fulton Controls Co. Devices include automatic temperature and pressure controls, bellows and balance assemblies, automobile thermostats, expansion joints, packless valves, seals, and engine controls.

Doehler Award—Dr. Matthew A. Hunter, dean emeritus, Rensselaer Polytechnic Institute, is the winner of the Annual Doehler Award. The American Die Casting Institute, which presents the award, calls it the highest honor of the diecasting industry. Dr. Hunter has been a consultant to ADCI research foundation for eight years.

New Service—A new motor selection service for original equipment manufacturers is being launched by General Electric. Called the "Econo-Match" program, it will have trained field engineers working with machine designers in studying the needs of the end user and matching the drive motor to those needs exactly.



-Center of Competing River-Rail-Truck Transportation

Now a major inland port, Memphis' harbor facilities are handling over 5-million tons of cargo a year. Freight shipments are expedited through a new \$1,400,000 public River-Rail-Truck Terminal, located on the above stillwater harbor and bordered by a 960-acre flood-free planned industrial development. Oil, chemical, grain, furniture, machinery and other industries are now operating from sites in this area known as Memphis Harbor and Industrial Development. They like the direct, low-cost access to markets and materials offered by Memphis' five scheduled barge lines, eight major trunk

line railroads, 91 motor freight lines and eight commercial air lines.

From Memphis, overnight motor freight service is available to St. Louis, New Orleans, Dallas and Atlanta. Third morning service or better is offered to virtually every market east of the Rocky Mountains. In rail facilities, a Memphis location offers direct one-line service to 25 states. There are 60 in-and-out freight trains every day. In addition, Memphis has low gas, electric and tax rates.

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*Costs only 4.4¢ per hr.
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Pacific Hydraulic Press Brake at Atlas Universal Service, Inc., San Francisco, has operated continuously 16 hours a day for 9 years and 27 days with average maintenance downtime of only 5.2 hours per year and a total maintenance expense of 4.4¢ per operating hour.

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MEN IN METALWORKING



H. E. Markley, elected executive vice president, The Timken Roller Bearing Co., Canton, O.

The Babcock & Wilcox Co., Atomic Energy Div.—**Dr. L. M. Currie**, elected vice president and a director.

Allis-Chalmers Mfg. Co.—**B. S. Oberlink** and **J. L. Singleton**, elected senior vice presidents; **R. M. Casper** and **L. W. Davis**, elected vice presidents.

American Forge & Mfg. Co.—**A. L. Graham**, named vice president, operations.

J. I. Case Co., Industrial Products Div.—**D. H. Mitchell**, appointed manager.



W. L. Hearne, appointed vice president, taxes, U. S. Steel Corp., New York.

Climax Molybdenum Co.—**E. K. Leavenworth**, appointed vice president.

Union Carbide Consumer Products Co.—**P. M. Buhrer** and **R. P. Bergan**, appointed vice presidents.

Morgan Construction Co., Combustion Control Div.—**H. S. Hall**, appointed manager and **J. J. Webber**, named asst. manager of the Division; **Strickland Kneass, Jr.**, appointed consultant; **S. S. Rickley**, appointed chief engineer, Morgoill Bearing Dept.; **W. H. Howard**, appointed Pittsburgh district managing representative.

U. S. Steel Corp.—**W. H. Buchanan**, appointed general attorney.

Aluminum Co. of America—**H. J. Endean**, named manager, closure sales, Pittsburgh, **R. D. Youkers**, appointed manager, Allentown, Pa., branch sales office; **J. R. Lynch, Jr.**, appointed asst. manager, Philadelphia district sales office.

Baldwin-Lima-Hamilton Corp., Loewy-Hydropress Div.—**W. R. Liebel**, appointed asst. product sales manager, rolling mills; **Felix Klein**, becomes asst. product sales manager, hydraulic machinery.



L. C. Simmons, appointed administrative vice president, accounting, U. S. Steel Corp., Pittsburgh.



D. A. Bessmer, elected president, The Timken Roller Bearing Co., Canton, O.

Kaiser Aluminum & Chemical Corp., Kaiser Chemicals & Refractories Div.—**R. W. Stephens**, appointed plant superintendent, Midland, Mich. refractory magnesia plant; **S. D. Shopher**, appointed works manager, Mexico Refractories plant, Mexico, Mo.

The Lamson & Sessions Co.—**S. P. Abbey**, named sales manager, Ohio Div.; **R. M. Casey**, named sales manager, Chicago Div.; **T. W. Kelly**, named sales manager, East—
(Continued on P. 94)



R. T. Klempay, appointed vice president, engineering, The McKay Machine Co.

(Continued from P. 93)

ern district; **R. G. Patterson, Jr.**, named sales manager, Central district; **Ray Burns**, named distributor sales manager; and **Bruce Fabens**, named manager, order service section.

Rockwell-Standard Corp., Stamping Div.—**J. A. Leake**, appointed sales manager, Utica, N. Y.



L. J. King, appointed vice president and asst. comptroller, U. S. Steel Corp., New York.

Micro-Path, Inc.—**D. W. Edmundson**, appointed sales manager.

U. S. Rubber Co., Mechanical Goods Div.—**M. J. Delehaunty**, named market planning manager; **Henry Davis, Jr.**, named field sales manager.



C. F. Simmers, appointed asst. chief engineer, Engineering and Construction Div., Koppers Co., Inc., Pittsburgh.



L. C. Koenig, appointed vice president, manufacturing, Lindberg Engineering Co., Chicago.

H. K. Porter Co., Inc., National Electric Div.—**K. C. Crain, Jr.**, appointed works manager; **Robert Johnson**, named director, engineering; **E. L. Kimball**, named steel engineering manager; and **R. A. Ditchendorf**, named industrial engineering manager, Ambridge Works, Ambridge, Pa.



T. J. Peters, appointed director, plant engineering and construction, Acme Steel Co., Chicago.

Gisholt Machine Co.—**William Nyberg**, appointed district manager, Pittsburgh office; **R. H. Presnall**, promoted to asst. sales manager, Madison, Wis.; **R. H. Stebbins**, named sales manager.

The Timken Roller Bearing Co.—**J. C. Selby**, named manager, quality control domestic and inter-

(Continued on P. 98)



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The American Laundry Machinery Co., Rochester, N. Y.
Atlas Foundry Co., Detroit, Mich.
Banner Iron Works, St. Louis, Mo.
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Blackmer Pump Co., Grand Rapids, Mich.
Casting Service Corp., LaPorte, Ind. and Brigman, Mich.
Centrifugally Cast Products Div., The Shenango Furnace Co., Dover, Ohio
Compton Foundry, Compton, Calif.
Continental Gin Co., Birmingham, Ala.
The Cooper-Bessemer Corp., Mt. Vernon, Ohio and Grove City, Pa.
Crawford & Doherty Foundry Co., Portland, Ore.
Dayton Casting Co., Dayton, Ohio
Empire Foundry Co., Tulsa, Okla. and Bonham, Texas
Florence Pipe Foundry & Machine Co., Florence, N. J.
Fulton Foundry & Machines Co., Inc., Cleveland, Ohio
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Kanawha Manufacturing Co., Charleston, W. Va.
Kennedy Van Saun Mfg. & Eng. Corp., Danville, Pa.
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Nordberg Manufacturing Co., Milwaukee, Wis. and St. Louis, Mo.
Palmyra Foundry Co., Inc., Palmyra, N. J.
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Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sonith Foundries of FMC, Indianapolis, Ind.
Standard Foundry Co., Worcester, Mass.
The Stearns-Roger Mfg. Co., Denver, Colo.
Washington Iron Works, Seattle, Wash.
Dorr-Oliver-Long, Ltd., Orillia, Ontario
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Otis Elevator Co., Ltd., Hamilton, Ontario



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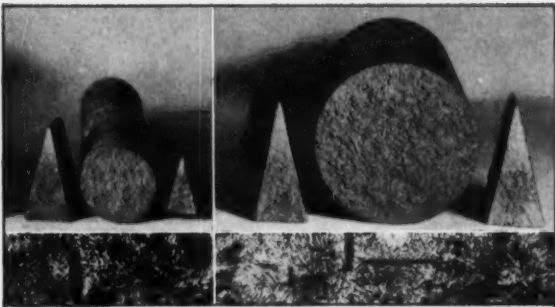
Bulletin 32—

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MEEHANITE®

THE IRON AGE, September 17, 1959



This photograph shows control of uniformity of structure with increasing casting thickness. Note that the microstructure is the same in both small and large sections.

During the melting of Meehanite metal, carbide structure tests are made before and after processing to insure complete control of micro structure, density and physical properties in the finished casting.

Casting solidity and uniform properties are assured regardless of dimensions with Meehanite metal.

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Meehanite metal represents the most advanced developments in the

metallurgy and manufacture of castings to specified physical properties. There are more than twenty-six different types of Meehanite® available for General Engineering, Wear Resisting, Heat and Corrosion applications.

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PAR ... Originated by TRS with the invaluable collaboration of some of industry's top production engineers who sought a major break-through in the automation of assembly operations to reduce costs.

PAR ... A name given by TRS to its Production Automated Riveting process ... continuously developed and perfected for 3 years. Proved successful in some of industry's most efficient plants. Now, TRS has sufficient engineers especially trained in the PAR process to serve all manufacturers.

PAR ... It makes riveting practically a new fastening method through efficiently integrated and automatic ...

1. FEEDING of tubular rivets or related products.

2. TRANSFER of parts between riveter stations by means of sliding or rotating fixtures or dial tables. Or through synchronization with conveyors.

3. SEQUENCING the operation of from 3 to 15 rivet setters which make all fastenings simultaneously or in any desired sequence.

4. CONTROL of setting force as required by parts thickness or material characteristics.

5. SENSING of improper conditions and stopping equipment to avoid injury to parts, equipment or operator.

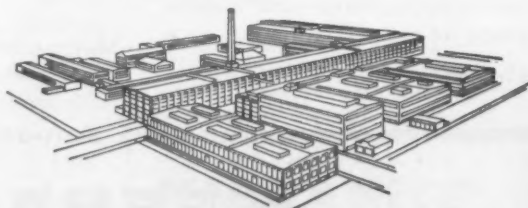
6. EJECTION of parts as required.

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*almost tripled production
—without adding to payroll*

Ford engineers wanted to step-up the production rate on a window gear and cam assembly. They called in TRS engineers.

Here is the remarkable automatic TRS Machine that resulted. Because center distances would not permit employment of a Multi-Head Riveter, a triple drive machine was adapted by TRS engineers. This eight dial station set-up receives a gear and cam assembly . . . greases it . . . receives a shaft and housing . . . sets three rivets to fasten shaft and housing to the gear and cam unit . . . ejects complete assembly. The machine does everything but load the parts. Ford Motor Company know-how shows in the profitable solution . . . so does TRS ingenuity and experience.

You get the benefit of TRS "recognized ability" when you buy any TRS Riveting Machine . . . from the simplest, standard type to a complicated special design.

TRS offers more machines, to more exactly meet your need . . . will lease but likes to sell . . . guarantees performance and sticks by you with all-out service.

PAR . . . It's a TRS Process for very good reasons!

Obviously, there are two critical elements in the PAR Process. Essential is the special and extensive knowledge and experience needed to design an integrated system of standard or multi-head riveters, feeders, transfers and controls for the particular assembly involved. Equally important are superior knowledge and experience in the design, tooling and application of Multi-Head Riveters because these are usually employed.

TRS originated Multi-Head Riveters over three years ago and is the only experienced source of these machines. Further, because this TRS development opened up new possibilities for automating the riveting pro-

cess, TRS was able to begin three years ago to develop the special experience and application engineers required to fully meet the requirements of the PAR Process.

PAR . . . A New Opportunity to Reduce Direct Labor Charges

With this new help, hundreds of manufacturers . . . large and small . . . can effect substantial savings in direct labor charges, increase production rates, decrease parts spoilage and machine down-time. Look into it now if your product can be riveted, and especially if several rivets are involved.

The yearly amortized cost of the TRS Multi-Head Riveter equipment is low because it will not be obsoleted by changes in product design or production line.

To save more . . . To protect against equipment obsolescence . . . don't buy any Riveting Machines until you investigate the PAR Process

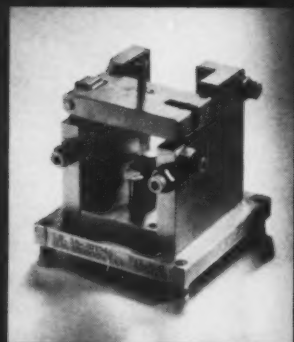


You're not required to use TRS Rivets but you'll be better off if you do

There are no contracts or obligations involved in the PAR Process. However, it is true that the more automatic you make your riveting, the more important it is to use rivets that reduce operating troubles and machine down-time. And, we can give you good, factual reasons why TRS Tubular Rivets are more reliable in essential qualities and uniformity. Ask for the facts . . . judge for yourself.

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Tooling with tape...



This drill jig: \$280.00



This drill jig: \$4.20

you can see the profit in
point positioning with
DIGIMATIC* model 202
Point-Positioning System

Ask us to arrange a demonstration with your parts.
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The lowest-cost
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positioning sys-
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tapping, ream-
ing, spot facing

Continued from P. 94)

national; **R. W. Dorn**, promoted to chief inspector, Canton and Gambinus Factories.



C. E. Alling, promoted to marketing manager, The Bullard Co., Bridgeport, Conn.



D. A. Booth, appointed engineering manager, Engineering Works Div., Dravo Corp., Pittsburgh.

OBITUARIES

H. L. Williams, 72, retired manager, Bethlehem Steel Co.'s Pottstown, Pa., works.

H. C. Stone, 47, a director and general superintendent, Belle City Malleable Iron Co., Racine Steel Castings Co., Racine, Wis.

R. E. Hess, 66, retired executive, Transue & Williams Steel Forging Corp., Alliance, O.

C. H. Reynolds, 68, retired vice president and former member of the board, The Sheffield Corp., Dayton, O.



Specialty Steel Stocks...to Serve You Better



To give you still faster service on "we-need-it-yesterday" orders for specialty steels, Ingersoll now maintains substantial stocks of stainless, high speed and alloy sheets, plates and ingots. In many cases, your order can be filled and on its way in a matter of hours. And because Ingersoll is a specialty mill, you get quality you can depend on to meet your analysis, size and thickness specifications. Call us now for your needs.

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Granite City Steel reports up to 125 heats for tapholes "cast" with Permanente 165 Ramming Mix

New technique developed in cooperation with Kaiser Refractories helps step up productivity of company's open hearth furnaces

Granite City Steel—whose outstanding modernization and expansion program has made it one of the nation's most efficient steel producers—has developed and proved a technique for "casting" tapholes when a furnace is down for ground rebuild. The "casting" practice (described in detail below) has produced the following exceptional results for four recent Granite City tapholes:

Furnace No.	Capacity	Taphole Life
22	250 T	125 heats
23	250 T	113 heats
24	250 T	92 heats
25	400 T	80 heats

Operators who have switched to Permanente 165 Ramming Mix consistently report exceptional performance—whether for new tapholes, for hot tapholes, or for furnace bottoms!

Permanente 165 is made from high purity Kaiser Periclase refractory grains (94-96% MgO) and ceramically bonds itself into a crystalline mass at relatively low temperature, providing fast furnace availability. This monolithic structure has exceptional volume stability, maximum resistance to hydration and to attack by iron oxide and slag. For furnace bottoms, its high density (averaging 175 pounds per cubic foot after firing) assures longer life.

Make your own comparison test and see how much more life you get with Permanente 165 Ramming Mix. Your Kaiser Refractories sales engineer will be glad to show you this taphole casting technique or to help with any basic refractories job.* Ask to see the new 30-minute color movie, "Progress in Modern Basic Refractories." Your Kaiser Refractories Sales Representative or Regional Office will be glad to make the arrangements.

*Ask for details on the new K/R Gunning System.

Call or write Kaiser Chemicals Division, Dept. S9123, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

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REFRACTORY BRICK & RAMMING MATERIALS • K/R GUNNING SYSTEM
CASTABLES & MORTARS • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS



1 In the Granite City Steel practice developed with Kaiser Chemicals, the first step is to dig out the hole to a diameter of approximately thirty inches. Although practices will vary from shop to shop, this digging usually goes down to brickwork under the pipe, and includes two to three feet of the flat in front of the pipe.

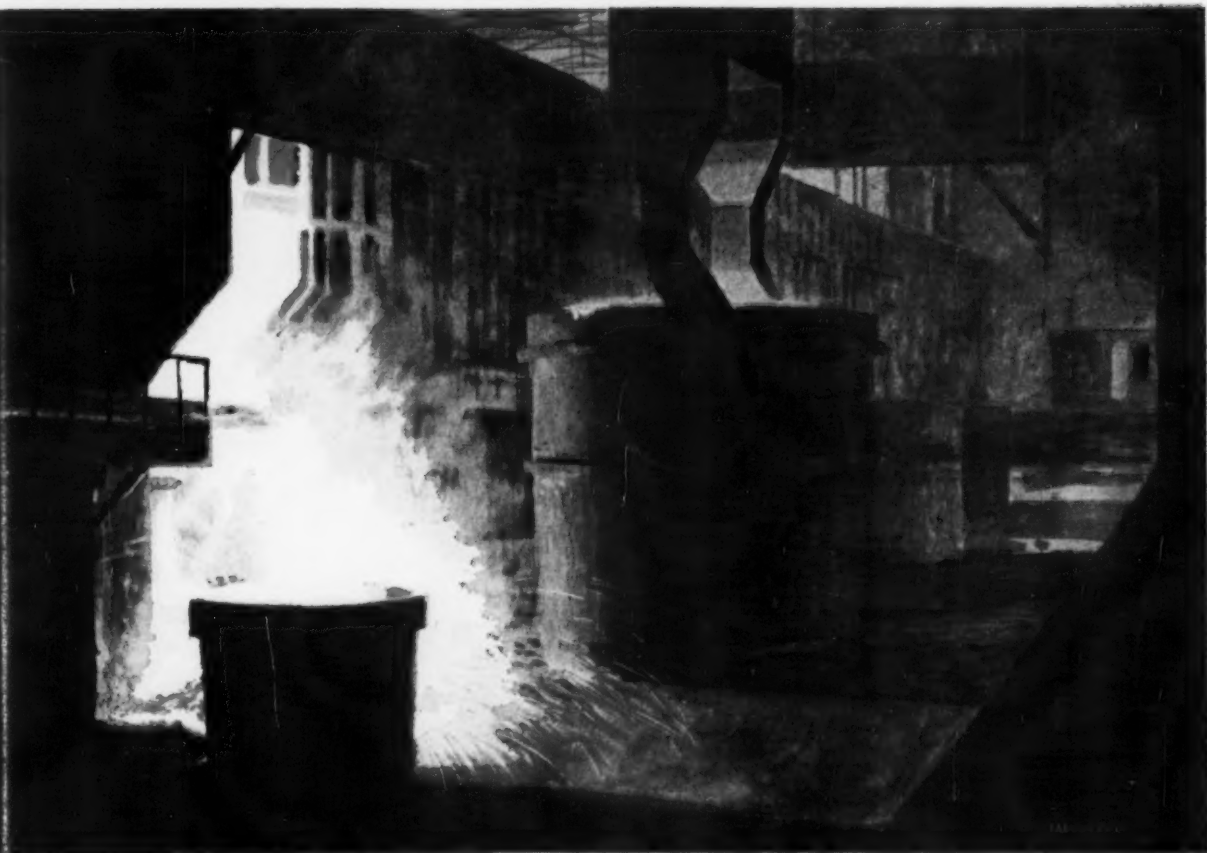


2 Next, a ¼-inch steel plate is welded to the casting in back of the furnace and a hole for the taphole pipe is cut in it at the proper height. The pipe is then set at the proper angle, with the back end protruding through the plate and the front end blocked up with brick . . . ready for the casting forms.



3 Carpenters erect a three-sided wooden form, following the indentations of the back banks as closely as practical. A "plug" nailed inside the front wall of the form fits into the pipe, supporting it so that blocking can be removed. Pipe is now welded to back plate . . . form solidly braced . . . and deck built around form.

4 The Pe
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Open hearth furnaces at Granite City Steel Company, Granite City, Illinois.



4 The Permanent 165 Ramming Mix is mixed in either regular mixers or mixer trucks. From seven to nine per cent water is used. Mix is at proper consistency when a high-frequency cement vibrator immersed in the Permanent 165 produces a "jelly-like" appearance.



5 When the Permanent 165 mix is poured into the form, the vibrator is used to achieve uniform mix density around the entire pipe. *This is the important feature* of the cast taphole: uniform density of mix at least six inches thick around pipe. Excessive vibrating must be avoided to prevent floating out of bond.



6 Although forms can be removed after only three or four hours, life is improved if the Permanent 165 casting is allowed to cure for several days. After the form is removed, the small section of the flat in front of the casting can be filled either by ramming or casting.

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Performance Reliability
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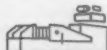
BULLDOZERS



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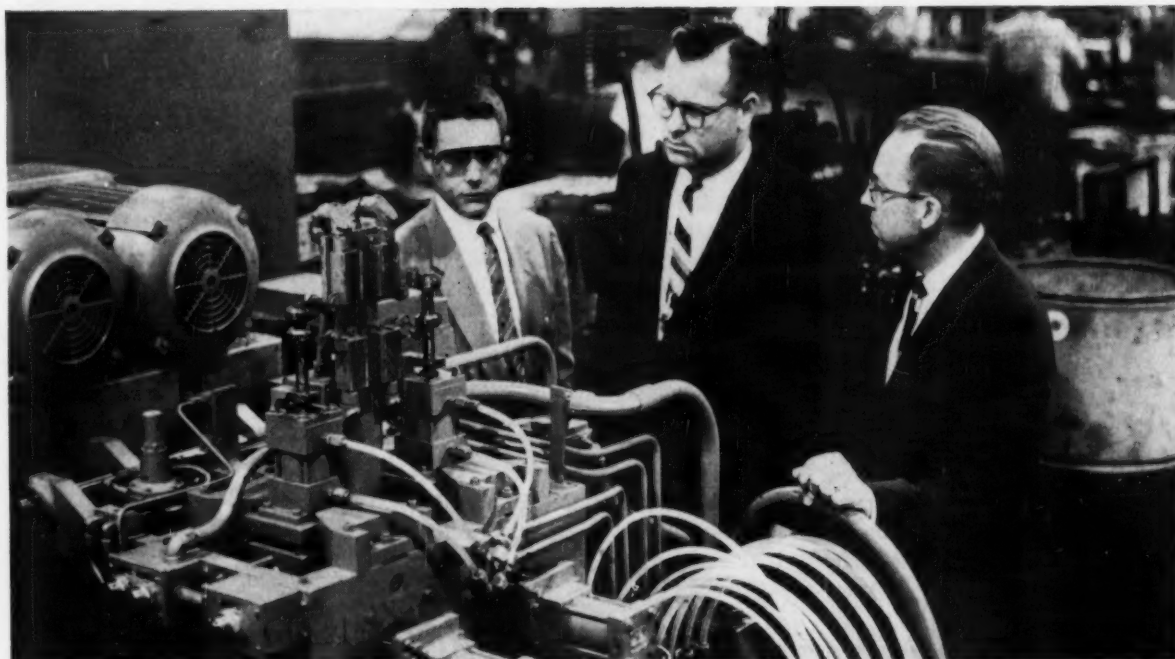


PUNCHES



HAMMERS

SALES AGENTS: Portland, Ore.: Allied Northwest Machine Tool Corp.; Los Angeles: Engen Industrial Co.; Philadelphia: Edward A. Lynch Machinery Co.; Milwaukee: Pagel Machinery Co.; Seattle: Perine Machinery & Supply Co., Inc.; Chicago: Polhemus-Miller Co.; Pittsburgh: Frank Ryman's Sons; Cincinnati, Columbus and Dayton: Seifrest-Elstad Machinery Co.; St. Louis, Kansas City and Tulsa: Robert R. Stephen Machinery Co.; Buffalo: H. D. Thweatt Co.



MANAGEMENT TEAM: J. E. Bell, E. L. Shue and C. R. Rhine, of Westinghouse's Small Motor Division,

Bellefontaine, O., inspect machine that automatically bores and ejects sleeve bearings onto conveyor.

How Operating With Automation Affects All Company Functions

Functions other than direct manufacturing must change when a company moves to automation.

The move demands tighter control of sales, purchasing, designing, and equipment buying.

By G. J. McManus
Pittsburgh Regional Editor

■ If you're treating automation as something that stops at the plant floor, you probably aren't getting the most out of new equipment. The whole company must be re-gearred when production tempo steps up.

This notion is just beginning to

take hold throughout the industry. It has already brought sweeping changes in sales, purchasing, engineering and other functions. It is working outward to change the lives of equipment and material suppliers.

"The whole concept of our support functions has been changed by automation," says J. E. Bell, manager of the Industrial Motor Dept., Westinghouse Electric Co., Pittsburgh. In part, says Mr. Bell, the change has simply been a question of better management. "You just don't have room to make mistakes. . . ."

Changes the Approach—In part, it has meant new standards of management. The Westinghouse Indus-

trial Motor group had to change its whole approach to equipment buying. Salesmen have gone to selective selling, and pushing for the kind of orders the machines want. Design engineers have learned to think twice about new ideas. They now consider special machine requirements along with customer requirements.

For the management of the group, automation has meant a doctrine of volume. The machines want constant, high-volume orders of standard models. Moreover, the pressure for numbers increases with the degree of automation.

The more a plant is automated, the faster profits go up and down

with volume, says Mr. Bell. "You increase your profit potential but you can lose your shirt in a hurry if volume drops without extremely good management control."

Use Automation—Four plants serve the Westinghouse Industrial Motor Dept. Three, Upper Sandusky, O., Bellefontaine, O., Union City, Ind., are high-volume plants. They employ centerless grinding, automatic winding and automatic presswork.

At Upper Sandusky, one man handles an operation in which coil stock feeds into a press line, is blanked out, separated into rotor and stator sections and stamped for stator slots.

At Bellefontaine, presses have been linked together in like manner, reducing crew size by a factor of 6 to 1. Union City has made comparable improvements. Auto-

mation is limited at the Lima, O., plant, but, here too, operations are being modernized. And, at all plants, mechanization continues.

For salesmen of the motor group, automation has demanded a more precise kind of marketing. Mr. Bell uses the term, "selective selling," calling it "one of the most neglected profit sources."

He says, "If product mix, order size and timing could be controlled perfectly, the potential for higher return on investment is amazing."

Customer Saves—It's to the advantage of customer and supplier to reduce change-overs and set-ups to a minimum if they're to benefit from mass production. One of the salesmen's prime objectives is to work with the customer in applying motors of standard design to specialized equipment.

This not only allows the customer

to get prices based on mass production methods, but it also gives the supplier a chance to realize an adequate profit because special tooling and handling are not required.

To the customer, it also means that replacement parts cost less, and are more readily available. Customers are encouraged to consider product re-design to avoid special motor details.

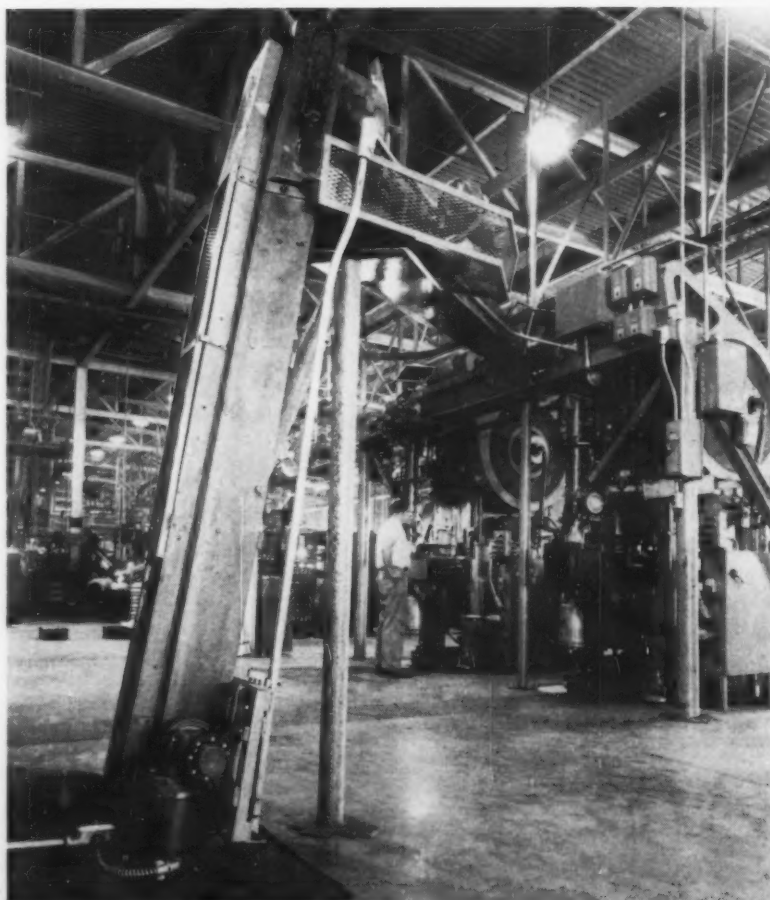
Variety Is a Problem—Motors for fans and coolers are still in a more individualistic state. The Upper Sandusky plant supplies something like 50 different windings. This variety is a production headache and makes it difficult to cushion seasonal swings by stockpiling motors.

The salesman's big job is to give the customer the whole story. The advantages of automation are many and well known, but in too many cases, the other side of the coin doesn't show. If the benefits of automation are to be fulfilled, both the customer and supplier must concede in some areas.

Planned Buying Pays—Orderly planned buying is a necessity. The customer gets his deliveries on time, obtains a constant high level of quality, and has no premium charges to pay for overtime and special shipments. The obvious benefit to the supplier is adequate profit.

Possibly more important to both parties are the level production rates which result from orderly buying. This prevents rapid fluctuations in labor force with all the problems that go with it during such periods. The price for improper timing of orders must be paid eventually by the customer as well as the supplier.

How far should the salesman go in his concessions to automation? For one thing, he must draw a line on how much can be given away to maintain production volume. Mr. Bell feels the failure to recognize this need has hurt the whole motor industry. With motors underpriced early this year and with demand



KEEP MOVING: Rotor and stator punchings fall into specially shaped hopper which positions them for pick-up on near vertical magnetic belt.

improving strongly, manufacturers were bidding against each other.

Remain Flexible—On the question of flexibility, salesmen may have to assert themselves. "Automation should not be carried to the point where it squeezes the last cost cent out of production," says C. R. Rhine, Sales Manager for Industrial Motors, "if this means you lose all design flexibility."

"The one thing certain," says Mr. Rhine, "is that market needs will change." He cites cases where companies have lowered their costs below those of competitors by automation, but have left themselves unable to move with markets.

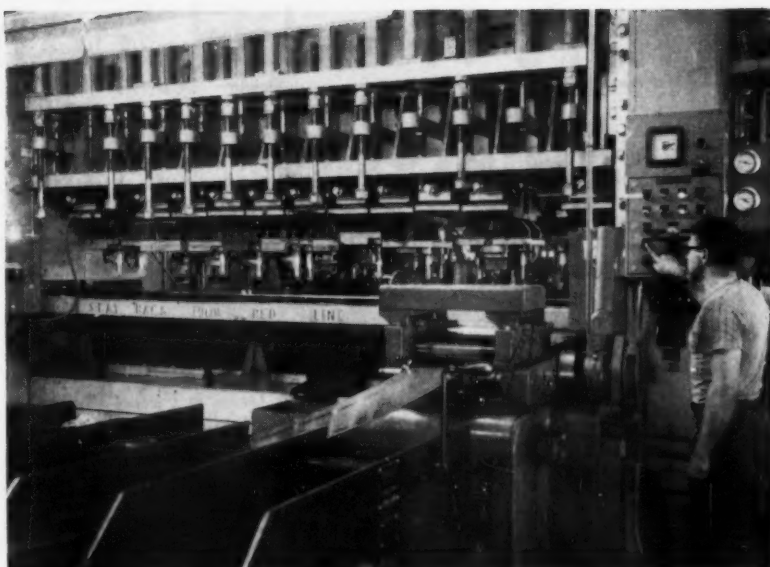
For design engineers, the basic considerations are the same as for salesmen. They must think in terms of standard models and long production runs. This calls for knowledge of production and also knowledge of customer applications.

Design For Applications—The design group of Westinghouse industrial motors has always been organized along application lines. With the advance of automation, designers have been drawn deeper and deeper into application work. Recently, Lima engineers virtually redesigned a customer's product in order that a standard motor might be used.

Design men must also understand the special logic of automation. Some time ago, Westinghouse had a long run of motors with extra long shafts for one customer. Another customer wanted the same design except that a drilled hole would be eliminated.

The second man wanted to know how much he would save by skipping the drilling operation. He was told that the simplified shaft would cost about ten cents more than the more complicated one. With the line already set up, it would have cost more to bypass drilling than to go through it.

Increase Engineering Staff—Manufacturing engineering has grown in importance and size at the Westinghouse industrial motor group. Post-



MOVES STEP BY STEP: This ten station automatic transfer press forms, pierces, and trims motor end bells at the rate of 25 per minute.

war automation has brought a 20 pct increase in the number of engineers. It has brought the formation of a manufacturing planning staff.

Mr. Bell says that the function of manufacturing engineering throughout industry has been upgraded. The old plant handyman is disappearing; companies realize that modern machines demand the attention of trained and gifted engineers.

For the purchasing department, automation means tighter control of incoming material. Steel must have the proper hardness and other specified properties or feeding machines won't work properly.

Avoid Extremes—Buyers must walk a tight rope between the danger of shortages on the one hand and the cost of protection on the other. Automated machines chew up stock so fast that excessive inventory protection can tie up all a company's cash. But, the penalties for shortages are that much greater with expensive equipment.

These considerations have brought pressure throughout industry for faster and more reliable delivery. To keep its buying competitive, the automated company must get the best delivery from suppliers.

Automation has brought new ground rules for equipment buying. Many of the new machines are custom built. There is often an element of uncertainty as to their performance; they usually require extensive adjustment and breaking-in.

Require Higher Standards—Mr. Bell feels it is necessary to fix responsibility more definitely for automated rather than standard lines.

Westinghouse insists machines meet performance standards before they leave the builder's plant. And the company has learned that automated equipment calls for a special competence that may not carry over from standard lines.

Should a company think twice about automation? For the industrial motor industry, there's little choice. Labor and material costs have gone up 30 pct since 1950. On the other hand, prices are still at 1950 levels. Only through automation and better material use can companies survive.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

What's Needed for Improving Your Sintering Setup

By R. Houlton—Industry Control Dept., General Electric Co., Roanoke, Va.

A review of automation controls available to sinter plants may be helpful to you.

New developments can be used by many plants.

■ Is your plant as automated as you think it is? Take the example of sinter plants. Many such plants are considered to be fairly well automated but this is actually not the case.

This seems strange. You'd think the physical make-up of these plants and the economics involved

would encourage a high degree of automation.

Where Does it Fit?—Where has automation been applied to the sinter plant? Where is it feasible to try it? Where does its application look inviting despite the present lack of knowledge?

The questions are important because it is expected that, in the years to come, sintering will become more vital to blast furnace operations.

Moreover, the tools and techniques involved can be applied to many other areas ranging from ore

beneficiation and direct reduction to strip rolling or processing.

How is sintering applied to steel making? It is a method whereby fine iron ores are agglomerated for use in the blast furnace. In the sinter plant, these materials are mixed with fuel and burned under an induced draft. The resultant clinker is then discharged ready for delivery to the blast furnace.

Four Areas to Study—The overall sinter plant is roughly broken into four areas: material receiving, preparation and transmission to storage bins; material blending, mixing, and flow control to sinter machine; sintering of material; material cooling, sizing, and delivery.

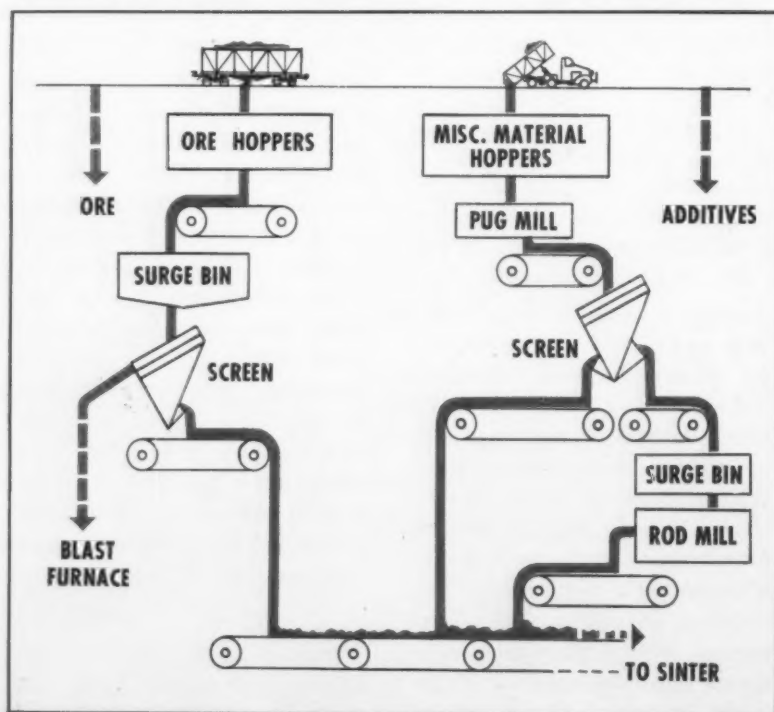
Material is received in a number of ways, such as from railroad cars, trucks, or conveyors. It is handled through yard hoppers, surge bins, screening stations, crushers, and pug mills, normally being conveyed by a multiplicity of conveyors.

Classify Ore—The only actual automation applied in this area is usually engineered to a specific requisition. This involves the classifying of ore into various grades for the purpose of entering the ore into appropriate storage bins.

The ore is analyzed on a continuous basis by an X-ray emission gage for such elements as silicon, aluminum, and sulfur. Control equipment then classifies the composition percentage as high, medium, or low. This information is fed in signal form to the tripper which directs the various grades of ore to predesignated bins.

Versatility—The control system is very versatile. It informs the

Conveyors Move the Materials



KEPT MOVING: Ores and miscellaneous materials, arriving at the sinter plant, move to many handling stations by the use of conveyors.

tripper when a bin is full so that the shuttle will be directed to an alternate bin. Thus, it can keep specific inventory of the stock on hand of the various classes of ores. The control system also provides a means of blending ores on the main mixing belts as they are withdrawn from the storage bins.

There are many other possibilities for automation in the material preparation area. For example, a screening station or pug mill could be used at best efficiency by measuring the amount of material leaving, and arranging for an equal amount of material to enter.

Regulate Feed—The amount of ore fed to the sinter machine is controlled by a weigh scale located at the discharge end of the last ore bin. When a regulator determines that the flow differs from a pre-set desired rate, it changes the speeds of all the ore feeders.

These regulators may be either a discontinuous, sampling type or a newly designed continuous regulating type.

It is obvious that system performances improve if the flow time can be minimized. What happens, though, when there may be a number of ore bins which are at varying distances from the scale that measures flow?

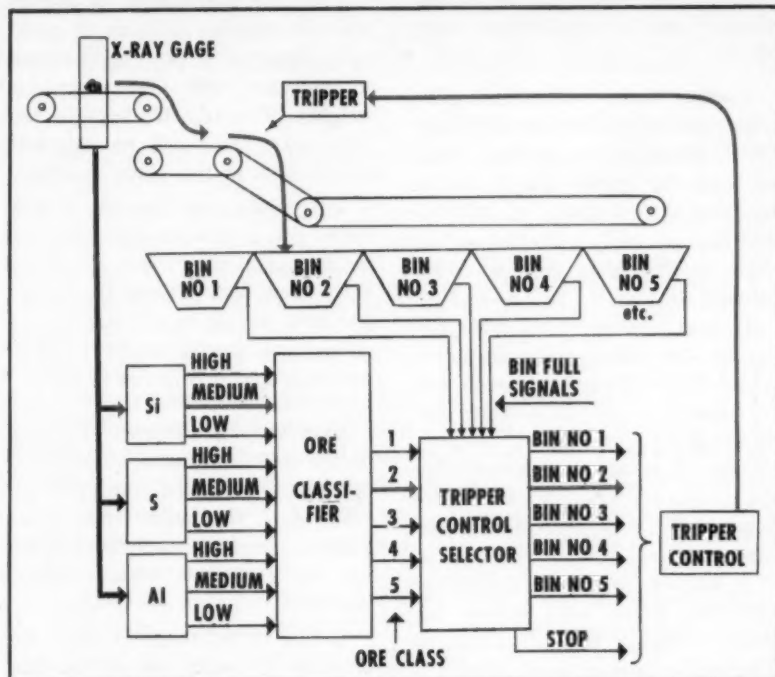
The practice has been to designate the ore bins closest to the scale as "trimmer bins" and to apply the changed flow rate to these bins. Thus, any small changes or short-time fluctuations will be handled by the trimmer bins.

Coarse-Ore Bins—The remaining bins are called coarse-ore bins and are controlled by a separate regulator. These run at a constant rate and are changed only when their speed deviates from the trimmer bins by more than a pre-set amount.

After a definite amount of ore is on the mixing conveyor, the next requirement of the system is to add fuel and other solid materials in fixed portions.

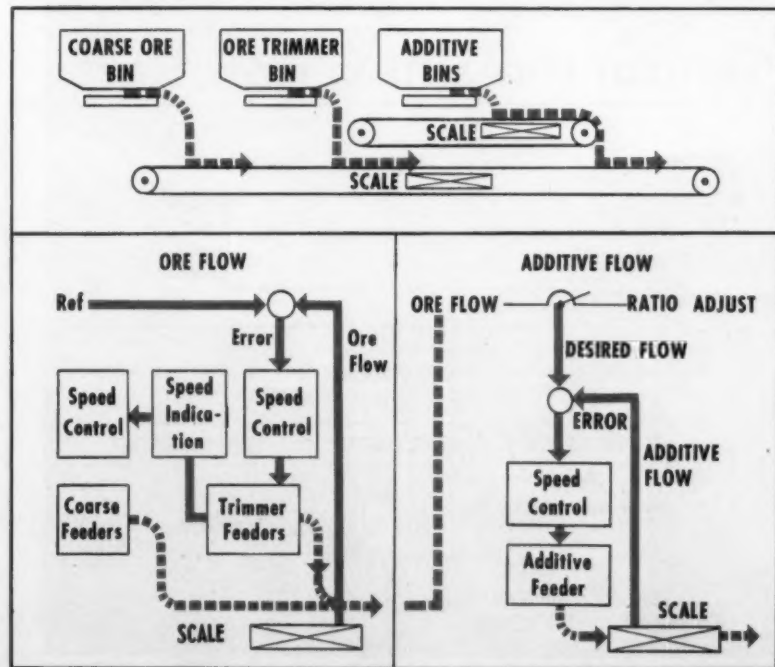
To accomplish this, an additive regulator is fed information from

Grade Ore Before Storing



WHAT'S IN IT?: Analysis of the ore for the percentage composition of specific elements must be known before routing to storage. Information is fed to tripper which directs various grades of ores to proper bins.

Blend to Proper Proportions



FLOW IN HARMONY: The proper amount of additives automatically leaves the bins and joins the flow of materials to the sinter machine.

the ore scale. An operator can then adjust his control so that a fixed percentage of additive may be discharged onto a short feeder conveyor.

Control Water—One of the most important ingredients requiring control is the water in the mix. Since each of the ingredients is subject to being wetted down in the storage bin or yard, the mixture has some water before any is added intentionally.

It is impossible to tell from day to day how much water is in the mix and, therefore, it is easy to add too much or too little water unknowingly.

This is usually discovered after the sinter machine gets in trouble because of the incorrect proportioning of water.

It appears as though a moisture detection device may shortly become available, and an automatic feedback system of water control is being applied to one sinter plant in anticipation of this.

Too Much Coke—The advent of a moisture detection device will provide a solution to another problem. This is the use of too much

coke, one of the most expensive ingredients in the sintering process.

The coke comes from its storage bin with varying amounts of moisture contained in it. The presence of moisture will give erroneous weights of coke. If there is too little coke, there will be improper combustion in the sinter machine.

To be safe, the operator usually works this in reverse and adds too much coke to the process, involving a waste of fuel. Therefore, an appreciable saving in the amount of coke used should result when a moisture detection device is used.

Burn-Through Point—Efficiency of the sinter machine is measured by location of the burn-through point. It is that point where combustion has been completed along the travel of the sinter machine conveyor.

If this burn-through point is too close to the entry end of the machine, it indicates that not enough material is being sintered and part of the sinter machine is being used as a cooling conveyor. Obviously, this is inefficient.

If the burn through point travels too far toward the discharge end

of the machine, it indicates that insufficient cooling is being accomplished on the sinter machine. Thus, the product will not be properly annealed when it reaches the sinter breaker. This will result in too much fracturing of the product and a disproportionate amount of return of hot fines.

The burn through point is detected by looking for the maximum temperature of the exhaust gases in the windboxes below the sinter machine. The signal of desired burn-through point is then checked with the signal of actual burn-through point to give an error signal.

A burn-through regulator, coupled with a continuous, integrating, control system will properly arrange to alter the flow of material as desired to the sinter machine.

Cooling and Discharge—As far as is known, no automation has been applied to the cooling and discharge area of the sinter plant. However, there are several possibilities for control in this area.

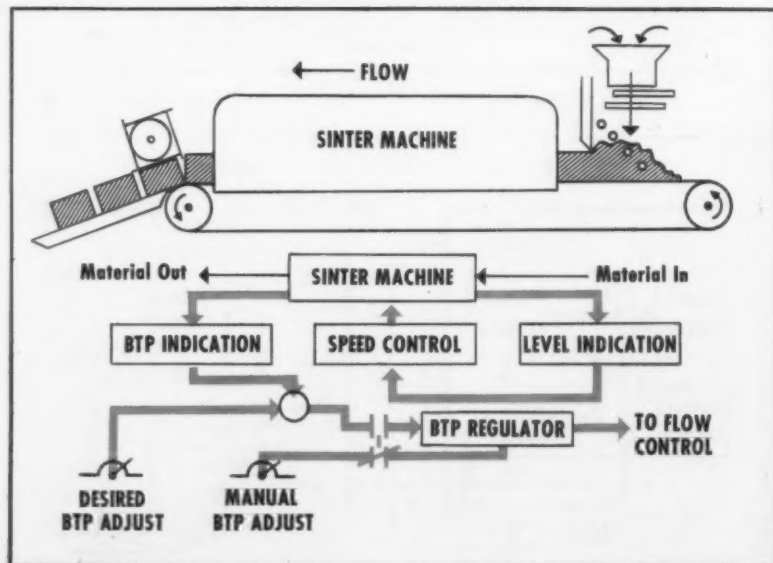
First, the screening stations and surge bins could have automation such as is applied to the preparation of material as described earlier. Second, it could be possible to monitor the temperature of sinter from the sinter cooler. This could be fed back to the speed of the sinter cooler to run it at the best speed for proper cooling.

Third, it might be advantageous to take readings on the composition and permeability of the sinter and feed these back to the mixing or sintering process in some manner.

Complete Control—It is apparent that there are a few things that need to be done before complete automatic control of the sinter plant is attainable.

The X-ray emission gage and continuous moisture detector will provide the answers to some of the missing links. Likewise, data logging equipment should help a particular user to arrive at many of the previously unknown process relationships.

Control the Sinter Flow Rate



NOT TOO FAST: For efficient use of machine, the flow rate must be adjusted to allow for proper sintering and annealing of the material.

Spark Bomb: A New Metal Former

Can Instant Power Handle the Tough Shaping Jobs?

The space age is upon us. To survive it, we need better metalworking techniques.

This new explosive technique could help shape space metals.

■ It takes a very critical metal, rich in alloy content, to absorb the punishment of outer space. Engineers know which metals do the best jobs. But there's one problem that still plagues designers about these metals.

Due to their traits, they're tough to form. They hardly have any "stretchability" at all. As a result, when further shaping is required, you must rely on complex equipment of great force to form the metals.

New Test—With this problem in mind, a handful of engineers assembled on Sept. 1 near Farmingdale, Long Island, to conduct a test. Its success was immediate.

What was the test? It concerned a device that converted electrical energy into mechanical power in a single instant. And it was done without electrical motors.

According to Adolph Kastelowitz, director of manufacturing research at Republic Aviation Corp., his own research crew has nicknamed the device the "spark bomb."

Not Costly — Basically, this means you can produce high-pressure explosive forming from simple, inexpensive equipment. Although man-made, the detonator's high-voltage spark acts in the same manner as lightning.

The bomb's operation is quite simple. At the start, electric power is fed into a battery of capacitors. Wires from the capacitors' termi-

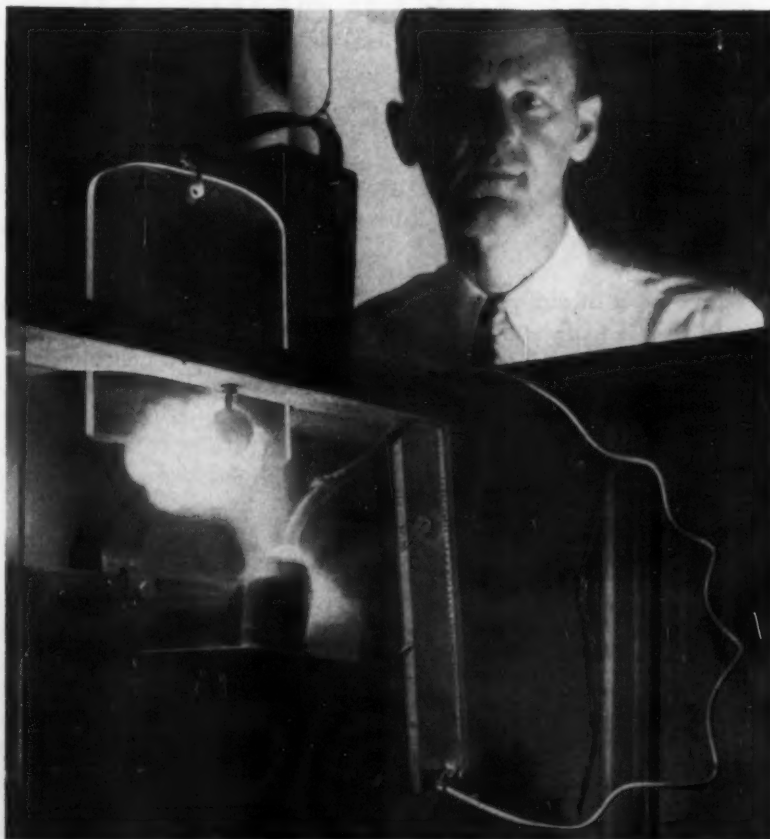
nals attach to two electrodes, both immersed in water.

The actual explosion occurs when a discharge switch is triggered. At this point, a high-speed spark travels through the water, creating a shock wave. And it's this shock wave that does the forming work.

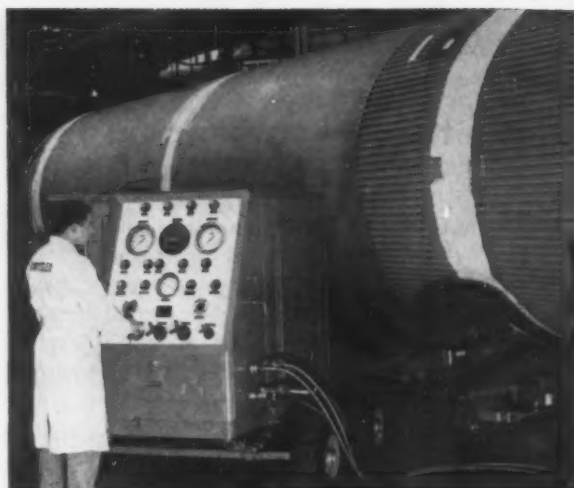
Instant Speeds—This sequence is very fast. In fact, it only takes 40 millionths of a second for the impulse to travel from electrical storage to its final power of 6000 hp. Even greater horsepower is expected before long. For engineers are now working on ways to speed up the spark bomb's release time.

Explosion techniques are not new on the metalworking scene. But, in the past, they've involved common blasting materials such as dynamite and other high-explosive compounds. Naturally, these methods are not too safe. And it's also difficult to maintain precise control over the energy created.

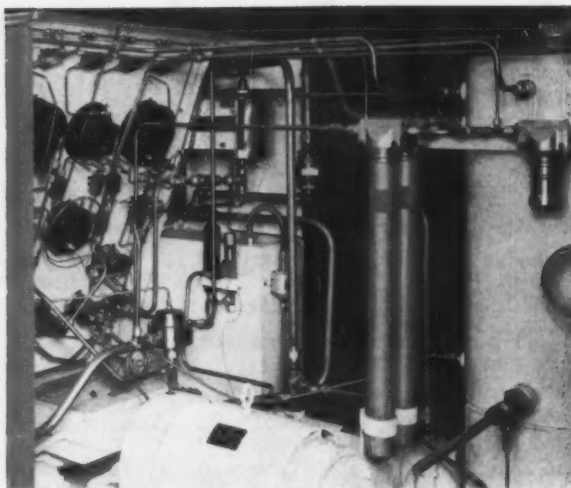
"We are working," says Mr. Kastelowitz, "toward eventual development of our device as a standard machine tool. It is very possible that such a tool costing about \$50,000 will replace the conventional hydraulic presses that run about half a million dollars a piece."



SPARK BOMB: Republic Aviation's Adolph Kastelowitz is right on top of this successful test that bulges an aluminum tube with 6000-hp force.



SIMULATES FLIGHT: Test cart puts hydraulics system of Jupiter missile through its paces. Fine filters in the equipment prevent contaminants from entering system. It adds up to smoother IRBM operation.



IN OPERATION: Two long-bowl filters, hooked in parallel in the hydraulic system of test cart, control particle size to two microns. Five-micron particles can cause the whole setup to fail.

Avoid Hydraulic Breakdowns With Improved Filtering

By **Walter Kasten**—Chief Engineer, Bendix Filter Div., Madison Heights, Mich.

Tiny specks of dirt can jam up your whole hydraulic system.

If that's the case, then a fine filter may be just what you need.

■ Dirt and dust are natural enemies of hydraulic systems. Now that the trend toward greater precision in American industry is really beginning to roll, there's no turning back. What met the tolerances and finishes on mechanical parts a few years ago is now old hat.

Take the aircraft and missiles field, for example. Contamination in fluid systems is one of the greatest hazards to the successful flight of aircraft and missiles. In fact, this is one of the most critical problems faced by the aircraft and missiles industry.

Particles as small as 5 microns (0.000195 in.) can cause failure of hydraulic units containing close-tolerance servo valves and actuators. Each step in the development and manufacture of missiles must prevent contaminants from entering the fluid circuits.

Test Carts—Portable hydraulic test carts for Chrysler Missile production of the Jupiter IRBM use special filters to control contaminant levels. These function with a high degree of efficiency and accuracy. The test cart simulates the missile hydraulic power system during production checkout of control systems.

Since the missile runs for many hours during production testing, as compared with the few minutes of actual flight, the fluid must be con-

tinuously cleaned as it recirculates.

George L. Nankervis Co., Detroit, builder of the hydraulic test cart, chose a special two-micron filter to maintain a flow of clean oil to the missile system.

Made for Aircraft—The two-micron filter was originally developed by Bendix Filter Div., Royal Oak, Mich., for uses in aircraft and missile ground service equipment and hydraulic test stands.

This filter provides a controlled filtration to a two-micron particle rating with absolute filtration to five microns. The filter's also used to clean fuels, lubricants, solvents, air, and other gases.

Source of Trouble—Contaminants of various types, such as rubber and metal particles, rust and

water, can enter hydraulic systems in a number of ways. During the manufacture of missile components, as with other products, dirt is inadvertently built in.

In a special "clean" manufacturing area there may be an average of over 7,000,000 particles, larger than one micron, per cu ft of air. Some of these particles naturally find their way into the manufactured product.

Manufacturing plants can be equipped with special ventilating systems to limit the amount of airborne dirt. But harmful contaminants, in many cases, still reach the ultimate missile hydraulic system. And during installation of components and piping, there is a further chance of dirt entering the lines.

Removes Dirt—The fine filter in the hydraulic test cart cleans up such inherent dirt. It also removes dirt that develops during missile production tests.

After the missile system and the test cart are put into use, other contaminants enter the fluid stream from wearing parts of such components as valves or pumps. In addition, improper handling procedures may introduce contaminants to the system.

Mostly Aluminum—The two-micron filter has an aluminum head, attached by screw threads, to an aluminum bowl. The bowl contains a fine filter element, retaining ring and O-ring seals. This element which does the actual filtration job is a cylindrical stack of washer-like disks cut from 0.005-in. thick phenolic resin-impregnated sheet.

A spring, running through the inside of the cylinder, holds the washers together, face to face. Filtration occurs between the washer layers. The filter element is non-corrosive and is easily cleaned to restore original filtration capacity.

An important advantage of such a design is the long flow path that's maintained in the element. This path is more than 3000 times the rated particle size. A long flow path prevents penetration of needle-

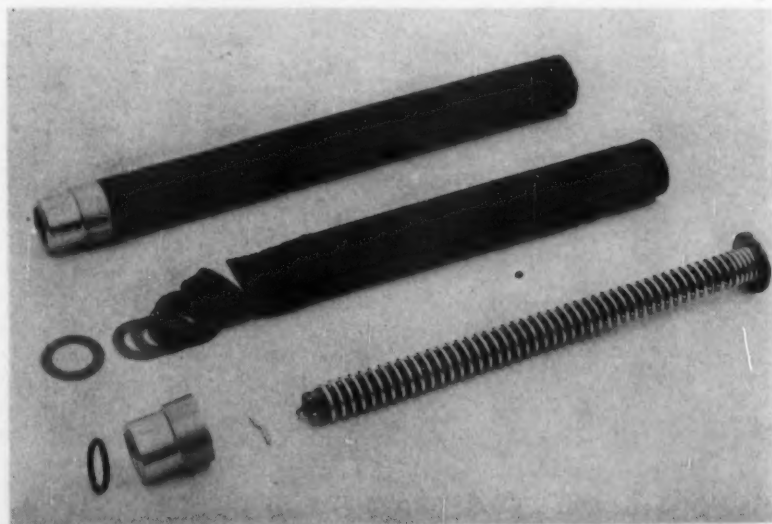
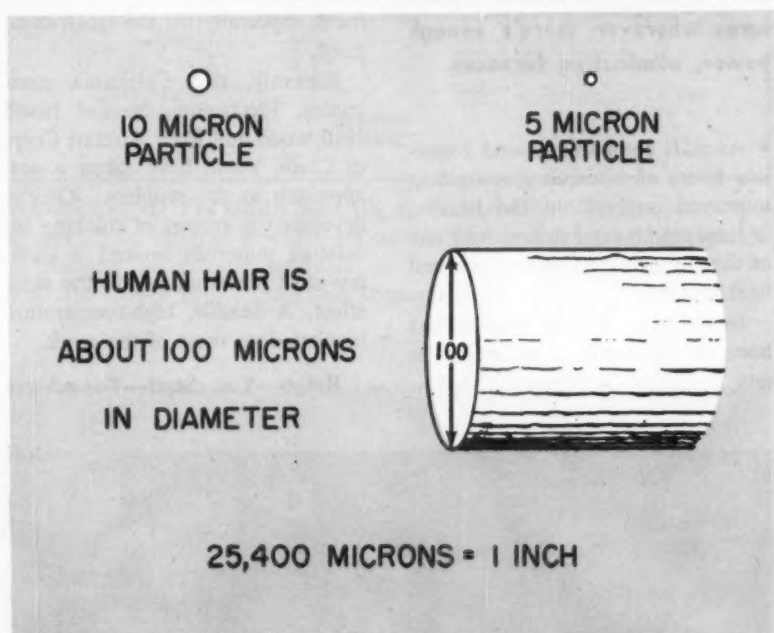
shaped particles into the flow stream under high pressure.

Useful Elsewhere—Today such extremely fine filtration is most vital to the missile and aircraft industries. However, as demands on machine tools become even more exacting, the fine filtration will find use in other areas as well.

Again, as precisions and tolerances on automatically-controlled machines become closer, they will have to contain servo valves and actuators for finer positioning.

This will, in turn, require ultra-fine filtration to keep these machines running. And, in the long run, it will lessen the downtime required for flushing and repairs.

How Big is a Micron?



FILTERS THE DIRT: Stacked washers of resin-pregnated cellulose assemble with center spring. Fluid flows from outside in, while outer edges of washers retain the particles. Each element gets sonic bath before it's assembled in air-conditioned, pressurized room.

Honeycomb Panels Get Braze In Electric Blanket Setup

By R. E. Crump—Chief Engineer, Electrofilm, Inc., North Hollywood, Calif.

With this new method, you can braze honeycomb structures wherever there's enough power, eliminating furnaces.

■ Aircraft companies spend countless hours of research investigating improved methods in the brazing of honeycomb sandwiches. And one of the big problems centers around heat transfer.

In the past, furnace brazing has been as successful a technique as any to handle honeycomb fabrica-

tion. But the outlay for the furnace itself can be an expensive investment, especially for the small company.

Recently, two California companies, Electrofilm, Inc. of North Hollywood and Rohr Aircraft Corp. of Chula Vista, have taken a new approach to the problem. They've developed a system of stacking insulating materials around a stainless-steel sandwich to give the same effect. A flexible, high-temperature blanket does most of the work.

Before You Start—To achieve

a satisfactory honeycomb braze, you must know the amount of heat needed to raise the workpiece to brazing temperature. And you can estimate that temperature if you know the mass of the work, its lumped heat capacity and the desired temperature rise during warm-up.

You can also calculate the heat lost during the operation. But the crux of the problem, aside from achieving the braze, is finding a procedure that insures economical use of heat transfer without losing its effect on other metallurgical problems allied to metal brazing.

Many Advantages—Although not a cure-all, this new furnaceless method does provide certain advantages. For one, it permits direct transfer of heat by conduction from the blanket to the work. It also eliminates investing in expensive capital equipment such as ovens.

Still another benefit involves the reduction in warm-up time. This can be done by using proper insulation and high watt densities (above 10 w per sq in.).

A well designed blanket setup spells operation across 20 to 300 v. In addition, the system's portable. Since the heating elements are light, thin and flexible, brazing can take place wherever space or power is available.

New Material—Where has this process been? The materials in the blankets are new. Each blanket consists of insulating materials made of ceramic fibers, woven to form the outside blanket surface.

Even though the blanket's outer covering is thin, at 1800°F it can



READY TO START: Saturable core reactors, controls, and temperature-monitoring equipment are installed. Honeycomb brazing can now begin.

deliver a dielectric strength of 500 v on ac. And at room temperature its high-potential value is 1000 v.

Pains were taken to develop as much lateral area as possible in the heating element for surface heat transfer. A woven wire mesh or conductor grid principle serves this purpose.

The cross wires in the grid act as equipotential busses in the event of broken wires. This feature insures a reliable heating unit for the heavy-duty operation.

Strict Procedure—Eight steps are necessary before you can begin brazing. After building a foundation of hearth bricks, you cover them with a layer of high-temperature insulating blocks. Next come two flexible silica insulating blankets and four heating units.

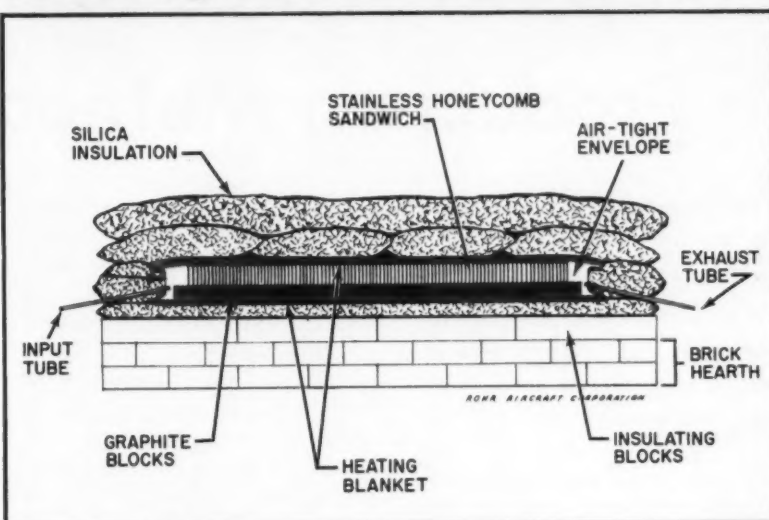
And, after installing temperature-monitoring thermocouples on each heater, use silica cloth for your next layer. This will give added dielectric strength to the setup. The brazing fixture is placed on top of the silica cloth. In the final step, make the electrical connections.

No Expansion—Electrofilm, Inc. also looked into the problem of conductor expansion and contraction. It came up with a patented technique of preforming the conductor that solves this problem without using external springs or weights. Only the two power lead busses stick out from the blanket.

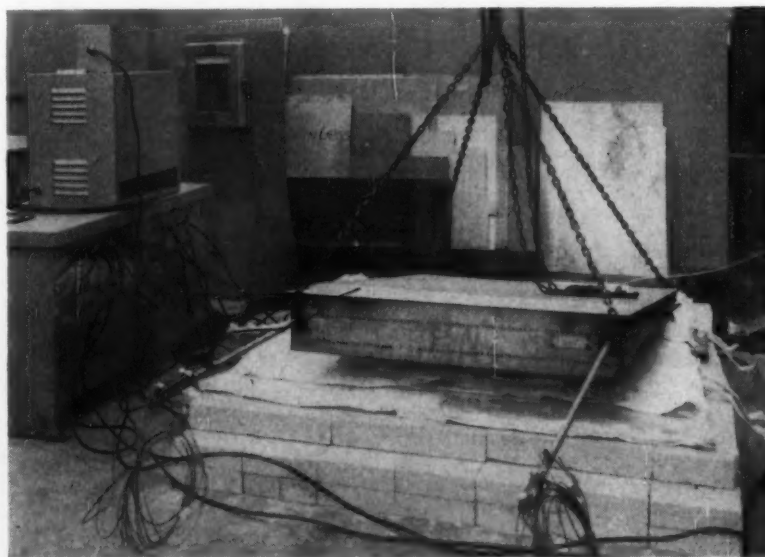
To date, brazes have been made about 1700°F. And they've been able to drive watt densities down to 7 w per sq in. (200 minutes elapse time). By increasing the densities, they've not only shortened the warm-up time but kept heat loss by conduction through the insulation to a minimum.

Even Braze—Here's another advantage in using blankets rather than radiant furnaces. By varying the watt density, you can maintain constant temperatures on such uneven surfaces as wedge shapes. You can do this by running each blanket on a separate variable power

Stacking Insures Brazing Cycle



PRE-BRAZING PROCEDURE: It's a must to follow the proper stacking procedure. Heating blankets are used either on the top and bottom of the stainless honeycomb sandwich or the bottom only. Graphite blocks under the fixture help diffuse heat throughout the area.



FIXTURE IN PLACE: Hoist lowers the stainless honeycomb sandwich in its proper position. Silica blankets on top give good insulation.

supply, each one responding to a thermocouple placed on the work.

There's a choice of using manual or automatic controls. In the latter case, saturable core reactors, excited by magnetic amplifier circuits, act as the power supplies. Motor-driven variacs, potentiometer-actuated, can serve the same purpose.

The blankets are also useful for metal aging and heat treating. In fact, they'll do a good job wherever surface heats of 1800°F are needed.

Electrofilm, Inc. plans to make these heating elements in such standard sizes as 12 x 60 in., 14 x 42 in., and 18 x 72 in.

Co-op Task Force Shows Savings In Production Methods

The second report from Comapro, the Cooperative Machining Project, is now available.

It points out cost cutting opportunities in production machining of a typical large volume component.

■ It's been slightly over a year since the story of Comapro was reported in *The IRON AGE*. How has it fared in this time?

Research, completed this last period, indicates that Comapro, short for Cooperative Machining Project,

is living up to all expectations. Its second report on how to machine a typical large-volume work component at the lowest cost per piece has just been made available to all who want it.

The first report, a work study on spark plug machining was distributed in the early part of the year. It has provided users of multiple-spindle bar automatics with a wealth of information on the efficient use of these machines.

Reviews New Factors—Comapro was born to cope with the fact that certain factors in machining prac-

tice and machining-cost analysis have been overlooked during the past 19 years.

Sponsored by 17 companies, allied with the production machining industry, this non-profit study group has been toiling away in a special area of the Cone Automatic Machine Co., Windsor, Vt. But, the Comapro work area is maintained by its own staff and is independent of Cone's plant equipment and functions.

Outfitted with equipment, stock, lubricants, and all necessary accessories supplied by the sponsors, Comapro technicians are able to tackle almost any machining study.

Reveals Time Savers—This second report, dealing with chain rollers, is an example of how these studies serve to point up the cost cutting opportunities. Take the four main categories of machine downtime: job changeover, perishable tool change, lubrication, and bar stock-loading.

Although optimum conditions have not yet been attained in all the categories mentioned, the report shows how 1.7 production hours per 8-hour shift could be saved in the production of chain rollers.

Exactly where can all this time be whittled away? How does Comapro arrive at these figures? Can Comapro point up other savings in addition to minutes and seconds at a particular operation? Let's examine the report on the production of these small chain rollers.

Offer Machining Info—For the machining of the specified AISI 8630 cold drawn bar stock, a steel manufacturer's recommendations for the surface speed was accepted. Tool cutting angles were varied until the best settings were determined.



WASTE NO TIME: Analysis of production methods shows that 1.7 hours per 8 hour shift can be saved in the production of these chain rollers.

Comapro soon found out that it need take only 8 minutes and 3 seconds to change all worn out tools on the chain roller job by the preset, quick-change tool holder method. With the use of conventional type tool holders, it takes a total of 77 minutes and 2 seconds.

An analysis of the circulatory system and the coolants demonstrates the importance of the correct oil to water ratio, the proper use of flexible or rigid leads and protecting the reservoir from chips.

Grease Is Vital—Proper greasing of the machine's slower parts is as essential to machine maintenance as are the principles of good design. An automatic lubricator assures proper attention to these parts of the machine.

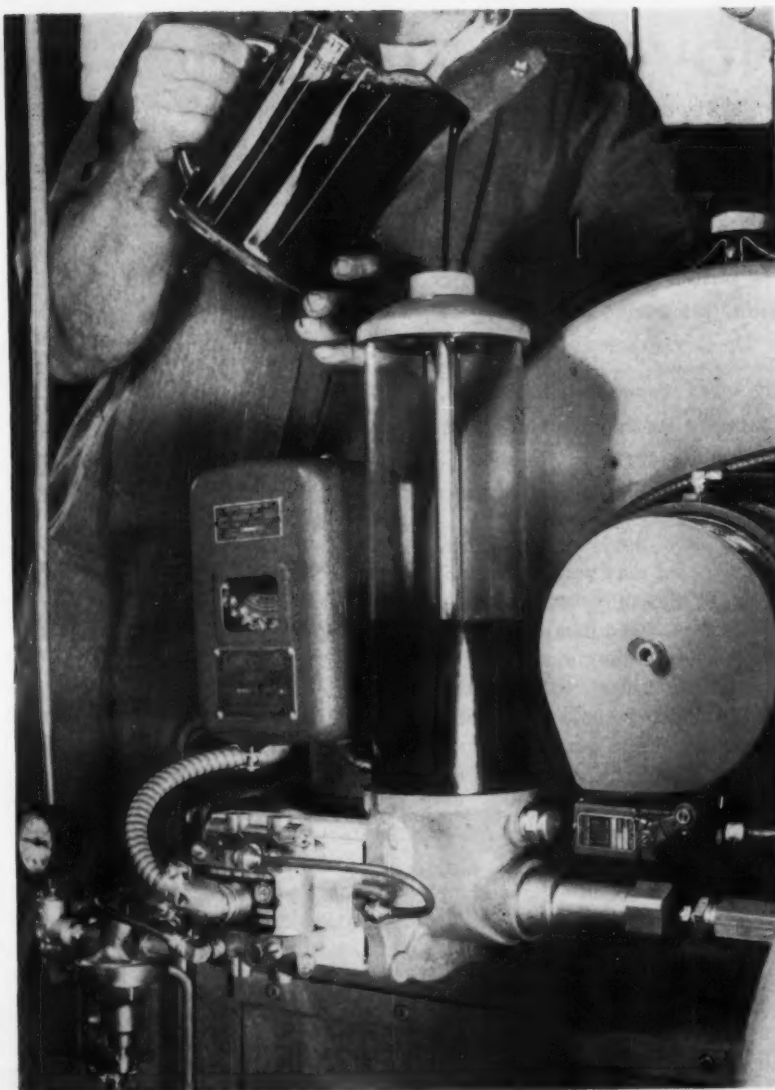
A time study of the customary pressure gun method of greasing discloses that 30 minutes are required every 16 operating hours for this important machine care. In addition to the time—15 minutes per 8-hour shift—and labor saving features of the automatic lubricator, the certainty of its application is assured.

When feeding 12-ft lengths of steel with conventional equipment, restocking is required 3 times every 8 hours. At an average of 6 minutes for each restocking, 18 minutes per 8-hour shift of machine downtime is required.

With the use of a continuous type of stock feed, this 18 minute period is turned into additional work pieces produced by the machine.

Total 1.7 Hours—Thus, it can be seen how 1.7 hours per 8-hour shift can be saved: 68 minutes and 59 seconds, in replacing dull tools with the pre-set holder, 18 minutes, by the use of a continuous feed for the bar stock, and 15 minutes, by the use of an automatic lubricator.

The report makes mention of other savings that can be achieved. For example, the continuous type of stock feed which can accommodate a larger range of rod sizes,



KEEP LUBRICANT READY: An automatic lubricator not only saves time and labor in keeping vital parts oiled, but it assures that the job is done.

saves 42 minutes on every job change by eliminating the replacement of the conventional spring pusher.

By the use of machine reference points in retooling the machine for the chain roller, 45 minutes and 42 seconds are gained compared to retooling the job without the use of the reference point chart.

More To Come—This report is an example of the type of information that Comapro intends to accumulate in detail. Other aspects that will be covered are not directly related to tooling or time cycles.

Vibration dampening mounts have been provided Comapro so that they can determine various advantages possible by isolation from in-plant vibration.

Kilowatt consumption meters to determine actual electrical current used by the various Comapro units have been installed. Reports dealing with the results of these tests will be forthcoming.

Users of leaded steel stocks will be interested to know that plans for the next report on chain roller development includes data on the machining of this part from a cold drawn leaded steel.

Novel Form of Heat Treatment Reduces Foundry Rejects

A patented process, "determinant tempering," is paying off for its developers.

It cuts foundry reject rate and improves the over-all quality of alloy steel castings.

■ Here is a novel form of heat treatment that may be just what the people in the alloy steel castings business have been looking for.

It is an invention, called "determinant tempering," a term that may, in time, become as familiar as "martempering" or austempering" to the foundryman or heat treat specialist.

Among the improvements in alloy steel castings attainable by "determinant tempering" are the elimination of cracking due to cooling

stresses, and improvement in all tensile properties normally impaired by cracks, retained austenite and carbon segregation.

Other benefits include a more uniform response from heat treatment, elimination of many welding difficulties, and improvement of machinability and wear resistance.

Constant Temperature—"Determinant tempering" is performed by subjecting the casting, during its initial cooling from solidification, to an isothermal treatment.

The temperature chosen for this isothermal anneal is at the nose of the Time-Temperature-Transformation (TTT) curve for the particular alloy. (These curves can be located in the proper handbook.)

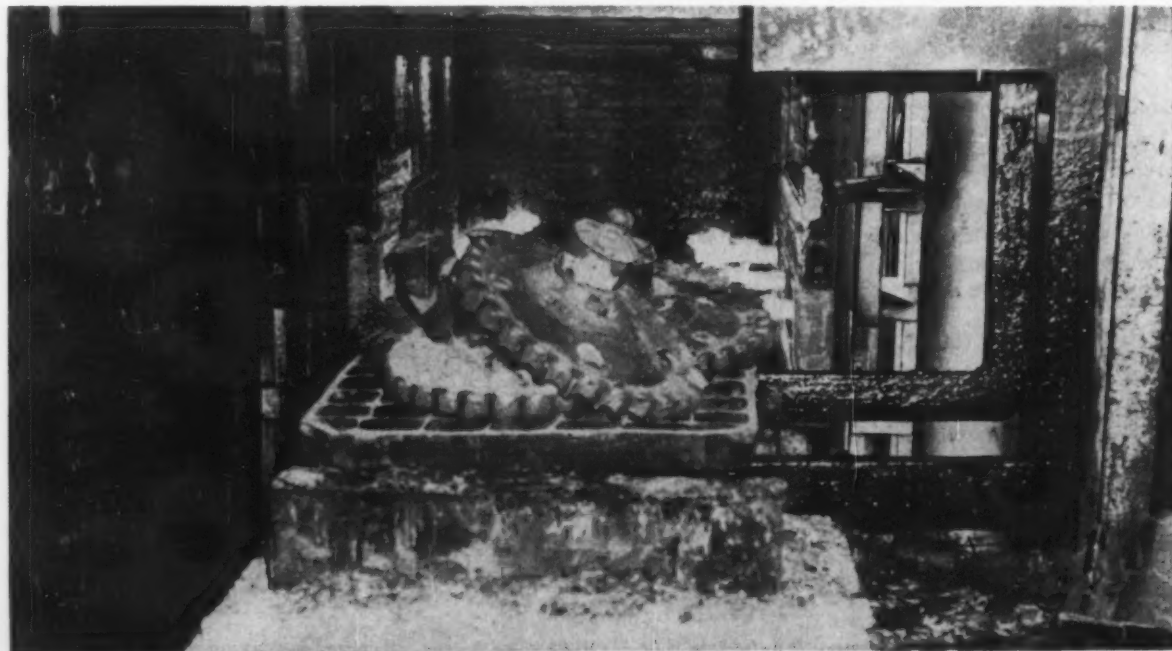
Thus, pearlite transformation is virtually completed prior to the

cooling of any part of the casting to a temperature that will allow the formation of brittle martensite.

Usual Cooling—In practice, castings are sand or mold cooled in the conventional manner to just below red heat after which they are subjected to the usual shakeout operation.

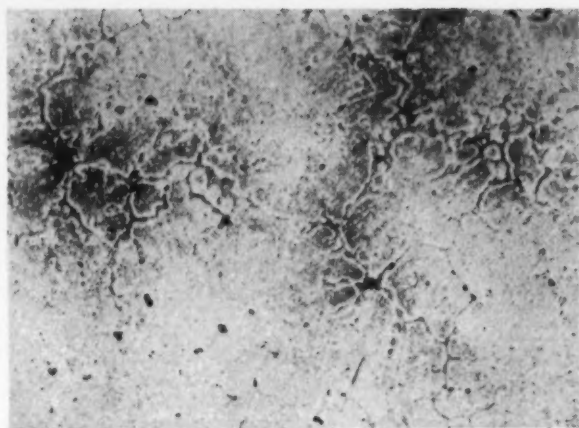
They are then immediately transferred, in the rough, to a car or batch-type heat treat furnace already operating at the TTT-curve nose temperature for the steel in question.

The castings are held at this temperature for the length of time designed by the TTT-curve for the completion of pearlite transformation. They are then air-cooled to room temperature and subsequently processed in the usual manner.

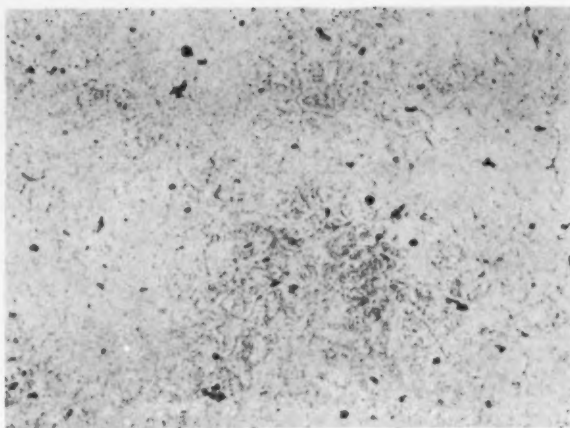


TRANSFER IN ROUGH: Sprockets, removed from molds as soon as possible, are transferred in the rough

to furnace to receive "determinant tempering" treatment. Furnace is already at proper temperature.



BETTER DISTRIBUTION: Note the more general distribution of precipitate in the AI-10Mg specimen



on the right. Samples were aged at 300°F, but one on right was first "determinant tempered," Mag.: 100X.

It should be remembered, though, that the "determinant tempering" treatment is, in general, not a substitute. Rather, it is an adjunct to the subsequent heat treatment of the metal in accordance with the usual practice for the various types of alloy steel castings.

Has Good Record—The process has been used at the American Foundry & Machine Co., Div. of the Eimco Corp., Salt Lake City, for over three years. It has enabled the successful production of thousands of tons of high hardenability, high carbon steel castings used in mining equipment. It has also greatly lowered casting repairs and the scrap rate.

"Determinant tempering" permits the casting of compositions not otherwise practical — for example, castings in the 0.60-0.80 pct carbon range or the 2-4 pct manganese range. These alloys are normally very crack susceptible and foundry scrap rates are quite high.

This ability to either eliminate or greatly reduce cracking susceptibility represents one of the most important applications for "determinant tempering."

Not only is this effect noted in the high hardenability steels but also in the conventional cast alloy steels.

Savings Are High — Moreover, with the "determinant tempering" innovation, substantial savings are

possible because castings can be produced close to final geometry minimizing the machining and grinding required in forging.

There are also other specialized applications for the process. These apply to other ferrous or nonferrous alloys not ordinarily produced by the steel foundry.

At this point, the logical question is: What makes the "determinant tempering" process work?

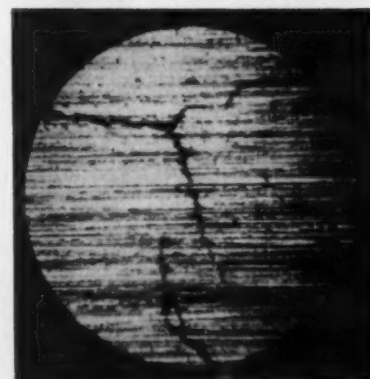
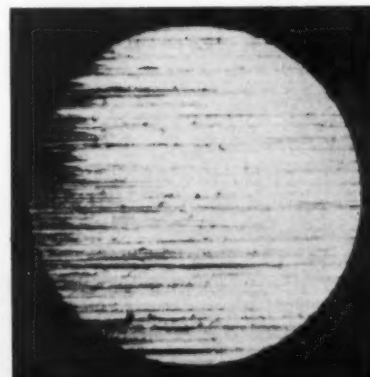
Actually, the exact mechanism of the process has not yet been fully ascertained. However, careful investigation has shown that carbon segregation in alloy steel castings is, to a certain extent, an irreversible process.

Hard To Eliminate—This is due to the stabilization of austenite which is retained below the martensite-start temperature during initial cooling from solidification. Once the retained austenite becomes stabilized, it is very difficult to eliminate by subsequent heat treatment.

But it is believed that if the austenite is completely transformed to pearlite before any austenite stabilization can take place, the carbon segregation will be reduced.

In fact, all carbon segregation will be effectively eliminated by this process and a microstructurally uniform carbon dispersion will be obtained in the steel, even though initial alloy segregation persists.

Thermal treatments, employed after initial cooling to room temperature has occurred, will not produce the same results because re-austenitizing does not necessarily



GRINDING CAUSES CRACKS:

Grinding cracks, caused by swing grinding of alloy steel casting can be seen in the specimen (bottom) that did not receive the "determinant tempering" treatment. Mag.: 15X

"Determinant Tempering" Improves Properties

Description of Material	Heat Treatment or Condition	Determinant Tempering Procedure	Mechanical Property or Physical Characteristics Being Evaluated	Without Prior Determinant Temper Treatment	With Prior Determinant Temper Treatment
1 Cast 4175 Steel	Martempered to 55-Rc	2 hrs @ 1250°F	Micro & macro cracks Yield Strength	Numerous 40,000 psi	None 250,000 psi
2 Cast 4140 Steel	Normalized and tempered 1 in. section	1½ hrs @ 1200°F	Rc variation to ¼ in. Jominy position	5 points	1 point
3 Cast 0.45 pct C Stainless Steel	As Cast	3 hrs. @ 1250°F	Grinding cracks Austenitizing Temp. for full hardening	Numerous 1600°F	None 1500°F
4 Cast Turbine Steel 0.2 pct C, 1 Cr, 1 Mo, 0.25 pct V	Normalize and temper to 225 Bhn	24 hrs. ¼ 1275°F	Room temperature Charpy V Notch Impact	19 ft. lb	40 ft. lb
5 Gray Cast Iron	As Cast	Reheat to 1600°F, cool to 1250°F, hold for 2 hours, done before initial cooling goes below 800°F	Hardness uniformity of sections in step blocks Tensile Strength in 1 in. section	½ in. = 178 ¾ in. = 163 1 in. = 159 1½ in. = 146 2½ in. = 140 4 in. = 134 20,500 psi	183 183 183 183 183 183 31,000 psi
6 Abrasion Resistant Alloy-White Cast Iron, 3 pct C, 17 Cr, 1.5 Mo	Sand Cast Sand Cast and reheated to 1700°F, air cool 40-50 Rc	6 hrs. @ 1300°F 6 hrs. @ 1300°F	Transverse Strength 1.2 in. bar 18 in. center Fracture Deflection Transverse Strength 1.2 in. bar, 18 in. center Fracture Deflection	2460 lb .094 in. 2900 lb .137 in.	4865 lb .162 in. 6390 lb 199 in.
7 2 pct Beryllium Copper Alloy-strip from cast ingots	Solution treated "H" condition	6½ hrs. @ 975°F	Grain Size	Coarse 33 microns	Fine 13 microns
8 Aluminum 10 pct Magnesium Sand Cast Alloy	Solution treated and aged for 36 hrs. @ 300°F	16 hrs. @ 700°F	Ductility of Samples aged to produce low temperature embrittlement	10.5 pct elongation	27 pct elongation

free the carbon segregation pattern from the alloy segregation pattern.

Need High Temperature—Even complete isothermal treatments do not produce an equivalent result, unless they be conducted after an austenitizing treatment which has been carried out at an extremely high temperature.

A further characteristic of cast alloy steels, of high carbon levels, is the tendency of these steels to form micro and macro-cracks during solidification. This is of an

even more irreversible nature.

This phenomenon is aggravated in heavy sectioned castings and appears to be associated with the hydrogen content of the cast metal. It is also common in castings having variable section sizes where the as-cast hardness of certain sections is in the 30-40 RC range.

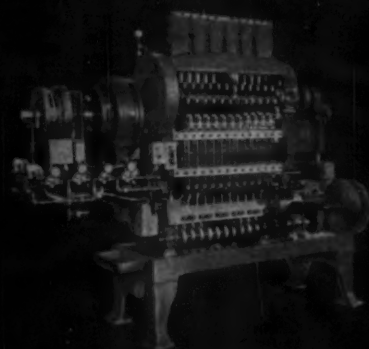
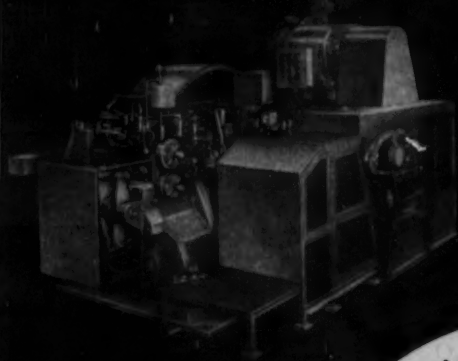
Prevents Cracks—It is claimed that the "determinant tempering" process will definitely prevent these cracks which, once created, cannot

be healed during any subsequent treatment.

It has long been the practice on some steel foundries to slow-cool certain types of alloy steel castings in their sand molds to minimize cracking problems. But this slow-cool does not permit the type of isothermal transformation necessary to effect the irreversible results described for determinant tempering.

"Determinant tempering" has Canadian Patent No. 552,999 and U. S. Patent No. 2,875,109.

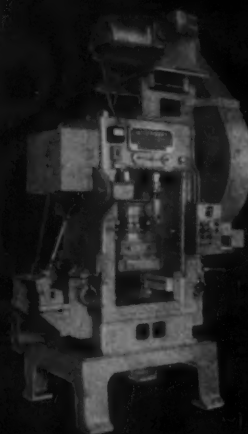
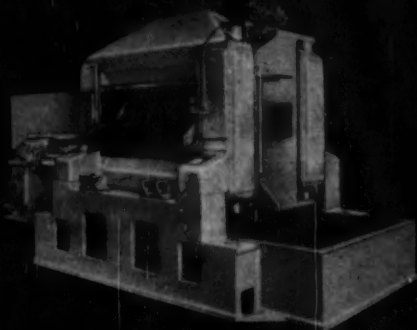
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New Patents In Metalworking

Free-Cutting Stainless

Free-cutting stainless steel, S. Nishikiori, July 28, 1959. A stainless steel displaying a high degree of machinability comprises the percentages 0.03 to 0.2 C; 0.1 to 1.5 Si; 0.1 to 2 Mn; 11 to 20 Cr; 0.04 to 0.5 at least one element from the group P, S, and Se; 0.05 to 1 Zr or Mo; 0.5 to 3 each of Cu and Al, and the balance essentially all Fe. No. 2,897,078.

Ingot Making

Steel ingot making composition,

method and apparatus, S. Nishikiori Aug. 4, 1959. Method and apparatus for producing uniform steel ingots with a minimum of flaws and blowholes, and having surfaces so clean that no conditioning is required. A mixture of molten steel and a molten metal oxide composition consisting of SiO_2 , Al_2O_3 , and CaO is poured in a prescribed manner. No. 2,897,555.

Rolling Strip

Continuous treatment of metal strip, L. Van Ormer (assigned to Jones & Laughlin Steel Corp.,

Pittsburgh, Pa.), Aug. 4, 1959. Method for continuous annealing and temper rolling of low-carbon steel strip, so as to produce a product highly uniform in physical properties from one end of the coil to the other. Conditions in the annealing furnace are adjusted to compensate for variations in the cold reduction operation. No. 2,897,698.

Charging Apparatus

Charging apparatus for blast furnace, J. M. M. Augeard, Aug. 4, 1959. Design for an improved throat or charging apparatus for a blast furnace which permits uniform

"Patent Review" appears in the third issue of The IRON AGE each month. Look for it in the October 15 issue.

charging of the furnace with ungraded, or raw, ore straight from the crusher. The deflecting device is situated above a chamber of revolution around the longitudinal axis of the throat. A double bell mechanism ensures uniform distribution of the charge inside the blast furnace while preventing escape of furnace gas. No. 2,897,984.

Stops Edge Cracking

Method of preventing edge cracking in the rolling of stainless steel, M. A. Orehoski and R. L. Stephenson (assigned to U. S. Steel Corp., a corp. of N. J.), Aug. 11, 1959. To prevent edge cracking during rolling of stainless steel slab, e. g., Types 310 and 316, carbon-steel bars are welded to the side edges, and the slab rolled in a direction parallel to the length of the bars. The bars are rolled into marginal



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strips, which are sheared from the slab. No. 2,898,667.

Surface Blowing

Surface blowing process for making steel, W. L. Kerlie (assigned to U. S. Steel Corp., a corporation of N. J.), Aug. 18, 1959. In the refining of iron, a bath of molten iron and slag in a converter is blown at a low angle of incidence against the surface. Iron loss is reduced and refractory life increased by controlling the circulating movement of the slag over the molten metal and by causing the gases to flow spirally through the converter. No. 2,900,249.

Sponge Iron

Method of making sponge iron, J. Celada (assigned to Fierro Esponja Sa, Monterrey, Nuevo Leon, Mexico), Aug. 18, 1959. Method for making sponge iron from iron ore in a relatively short period of time, and with high recovery of the iron content. A reducing gas mixture of hydrogen and carbon dioxide is heated and mixed with preheated air, and this mixture then passed through the bed of ore to perform the reduction. No. 2,900,247.

Cold-Rolling Lubricant

Process of cold rolling steel sheets, J. Donnelly (assigned to W. M. Donnelly, Hamilton, Ont., Canada), July 28, 1959. A lubricant for the cold rolling of steel sheets consists of acidulated vegetable oil "foots," i. e., the neutralized residue derived from caustic refining of vegetable oils. Sheet steel so lubricated need not be passed through the usual hot alkaline bath prior to galvanizing. No. 2,896,486.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

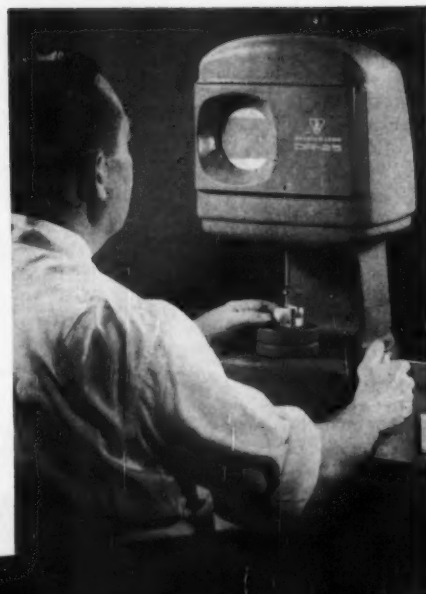
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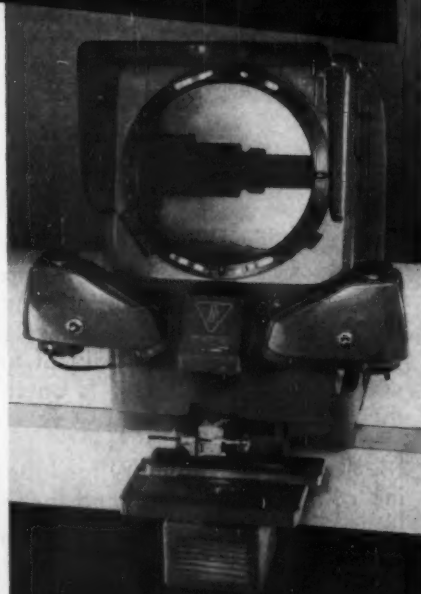
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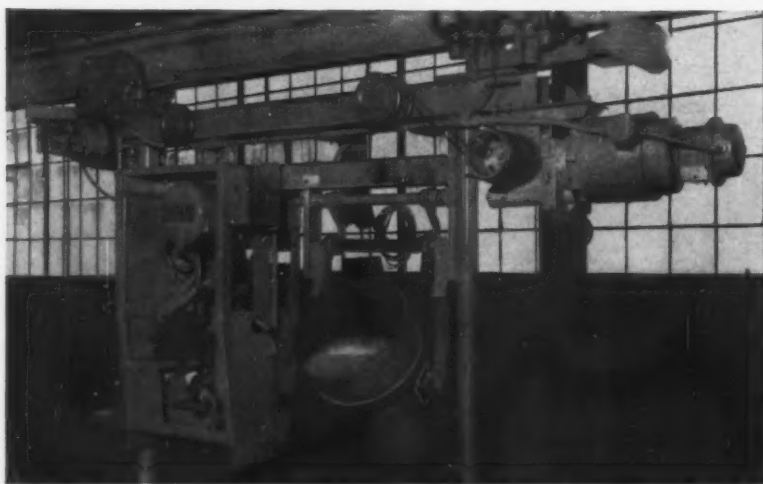
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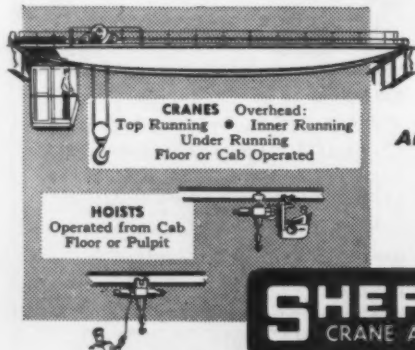
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FREE LITERATURE

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 125.

Thread-Rolling Machine

A 10-page bulletin describes the Lan-Nu-Rol, a small, rugged, simple, and low-cost thread-rolling machine. Using two cylindrical dies, it is suited to infeed or thru-feed rolling. Complete specifications and capacities are included. (Landis Machine Co.)

For free copy circle No. 1 on postcard, p. 125

Cement Gun

A cement gun for gunning refractory mixes in diverse applications is described in a four-page brochure. Speed, control, one-shot application, and other advantages are stressed. (Cement Gun Co.)

For free copy circle No. 2 on postcard, p. 125

Tubular Products

A 12-page bulletin outlines a line of stainless-steel, nickel, and nickel-alloy tubing, special metals and alloys, and fabricated parts and specialties, including platinum products. (J. Bishop & Co.)

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Bending Rolls

Standard and optional features of a line of power- and hand-operated bending rolls, for forming sheet stock into cylindrical shapes, are detailed in a 14-page brochure. (Wysong & Miles Co.)

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Adjustable Tool Holders

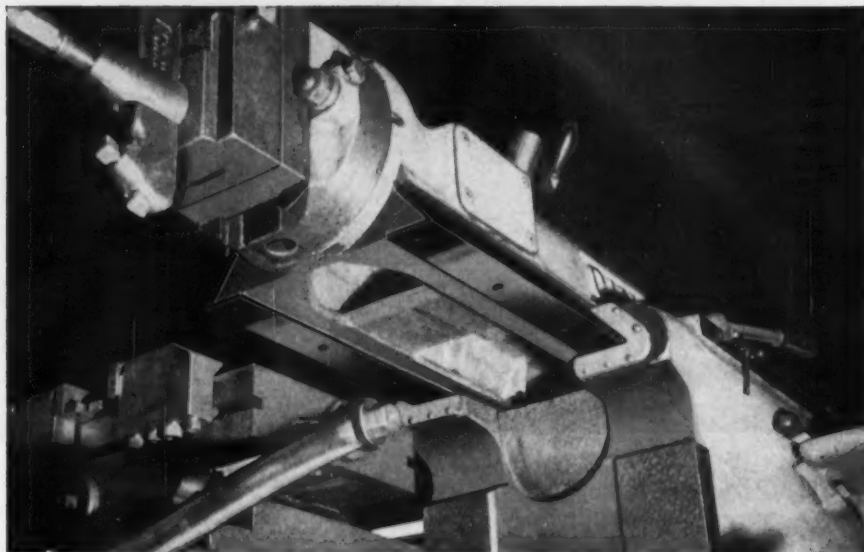
A catalog sheet describes a line of completely adjustable flanged turret-lathe tool holders, made for standard turret sizes of Warner & Swasey and other popular turret lathes. (Gahr Machine Co.)

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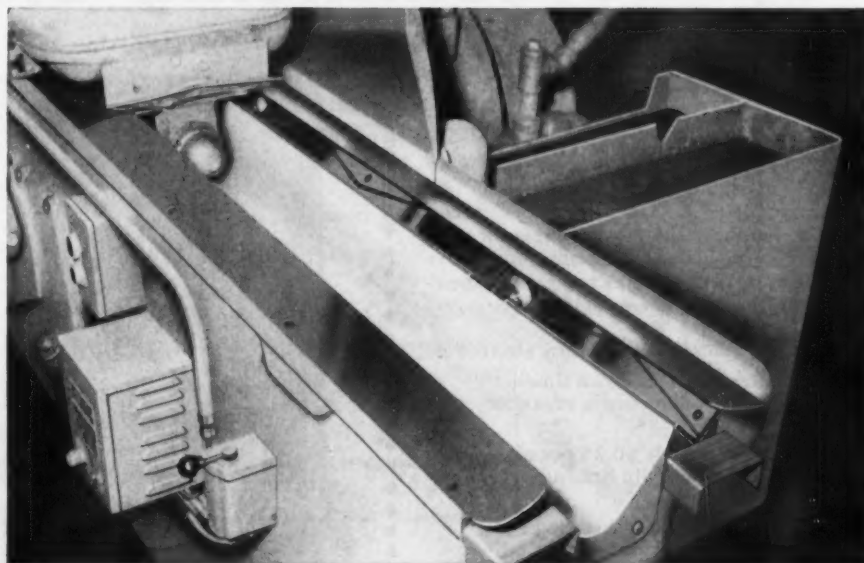
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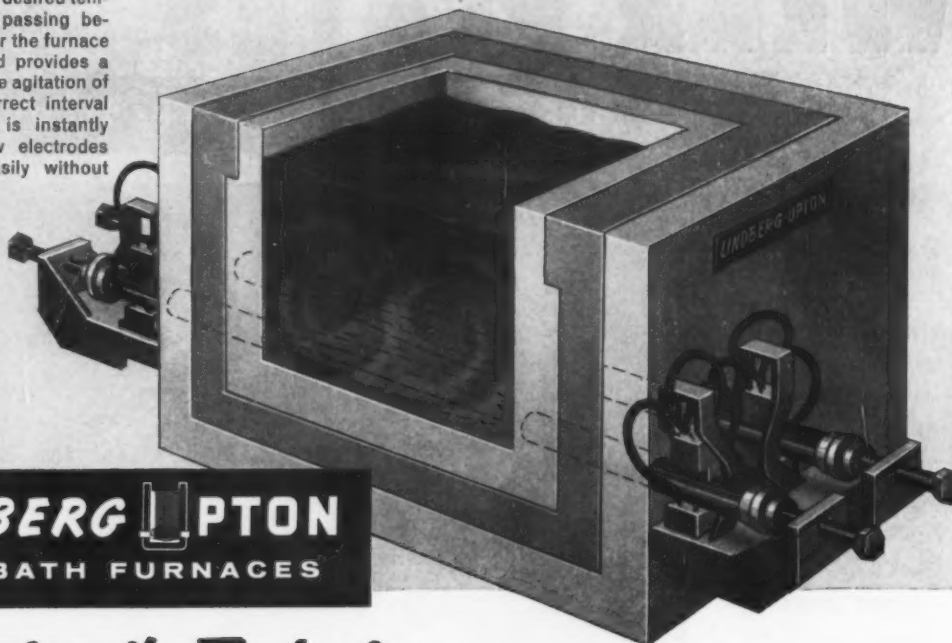
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Salt is kept at precise desired temperature by current passing between electrodes near the furnace bottom. This method provides a constant furnace-wide agitation of the molten salt. Correct interval between electrodes is instantly maintained and new electrodes can be inserted easily without furnace down time.



LINDBERG-UPTON
SALT BATH FURNACES

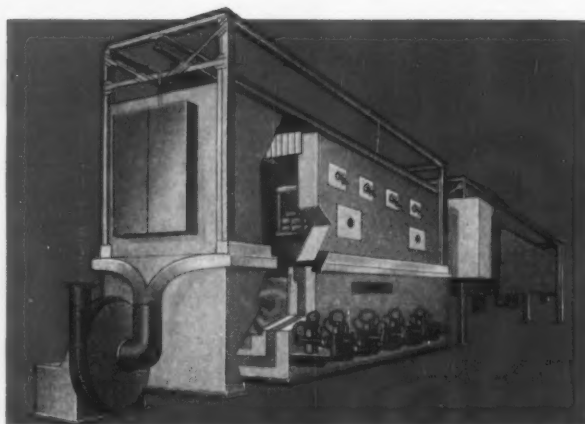
Featuring the Exclusive Graphite "Continuing" Electrode

MORE EFFICIENT, MORE ECONOMICAL FOR ALUMINUM DIP BRAZING

With Lindberg-Upton's graphite "continuing" electrodes you can eliminate problems inherent in ordinary high alloy electrodes for aluminum dip brazing. An exclusive feature of Lindberg-Upton Salt Bath Furnaces, these graphite electrodes also provide a superior technique for treating high speed steels and super alloys requiring extremely deep furnaces and high temperatures up to 2500° F. Here are some of their advantages:

- No flux contamination as with alloy electrodes.
- No electrode replacement down time—"continuing" electrode is easily advanced as needed.
- Low cost—approximately \$0.25 per electrode per month in aluminum dip brazing applications.
- Unique starting coil makes this the easiest electrode furnace to start or restart.
- Temperature uniformity within $\pm 2\frac{1}{2}^{\circ}$ F.
- Unobstructed top surface area.
- Pot area unobstructed for fast, easy cleaning.
- Monolithic walls—less than 8% salt absorption.
- Sizes up to 50' or more in length.

Your local Lindberg Field Representative (see your classified phone book) will explain how Lindberg-Upton furnaces can help you. Or write us direct. Salt Bath Furnace Division, Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois. Los Angeles plant: 11937 South Regentview Avenue, at Downey, California. In Canada: Efco-Lindberg, Ltd., Toronto.



A complete Lindberg installation—preheat furnace at right, holding chamber at top left. Lindberg-Upton Salt Bath Furnace with graphite "continuing" electrodes below at left. Necessary wash tanks (not shown) were included in the final installation.

When you select Lindberg-Upton Salt Bath Furnaces you have the additional advantage of dealing with one responsible source, Lindberg, for all necessary industrial heating equipment needed to fit your production processes effectively. Here is a cut-out view of a complete salt bath installation engineered and field-installed by Lindberg Industrial Division. Single responsibility for the efficient operation of the complete unit is your best guarantee of full satisfaction.

LINDBERG *heat for industry*

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Seam Welders

A bulletin describes a new line of standard seam welders, available in three sizes ranging from 50 to 400 kva. They feature an anti-friction slide and new transformer design for maximum power efficiency. (The Federal Machine and Welder Co.)

For free copy circle No. 21 on postcard

Shaped Alloy Wire

A four-page technical bulletin on special shaped alloy wire lists properties, advantages, and some applications. A large number of shapes are available in a wide range of alloys. (H. K. Porter Co., Inc., Riverside-Alloy Metal Div.)

For free copy circle No. 22 on postcard

Compressed Air

A booklet describes the fundamentals of compressed-air operation, and equipment used. It is designed as a selection guide to small "packaged" air compressors for automotive or industrial application. (Ingersoll-Rand Co.)

For free copy circle No. 23 on postcard

Liquid Fluxing

A four-page bulletin describes a make of liquid flux and a device for putting it in the torch flame in controlled flow for brazing operations. (The Sight Feed Generator Co.)

For free copy circle No. 24 on postcard

"Hand" Electroplating

A brochure describes a process of electroplating selected areas without using immersion tanks.

Like painting, the process uses an electrified hand-held wand. Easily mobile, the equipment can be taken anywhere for repair work, precision fitting, decorative work, plating of isolated sections without disassembly, and a number of other uses. (Sifco Metachemical, Inc.)

For free copy circle No. 25 on postcard

Aluminum Pre-Anodizing

"Preparing Aluminum for Anodizing" is a single-page pamphlet containing application information on a line of preparation compounds. It reviews products and methods of cleaning oil and scale, removing buffing compounds, and cleaning of silicon alloy castings. (The Frederick Gumm Chemical Co., Inc.)

For free copy circle No. 26 on postcard

Testing Services

A six-page bulletin describes a company's facilities and services for analysis, development, research, and inspection of materials and products. Among the many services offered are metallurgical studies, metals chemistry, plastics evaluation, and physical testing. (United States Testing Co., Materials Evaluation Div.)

For free copy circle No. 27 on postcard

Furnaces

Five new catalog bulletins describe, respectively, pot-type furnaces—fuel-fired and electric, box-type fuel-fired furnaces, box-type electric furnaces, bell-type furnaces, and atmosphere generators. (Sunbeam Equipment Corp.)

For free copy circle No. 28 on postcard

Metal Forgings

A 12-page handbook on metal forgings discusses the differences in cost and processing between castings, complicated machined part assemblies, solid forgings, and cored forgings. Saving of material and the strength and finish that come with forged parts are stressed. The economy advantages of cored forgings are covered in particular

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 9/17/59

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FREE LITERATURE

detail. (Bridgeport Brass Co., Cored Forging Div.)

For free copy circle No. 29 on postcard

No-Corrosion Fasteners

A 174-page combination reference handbook and catalog of stainless-steel and nylon fasteners provides basic data on fasteners and lists a line of screws, bolts, nuts, rivets, and pins of all types. (Anti-Corrosive Metal Products Co.)

For free copy circle No. 30 on postcard

Vinyl-Coated Steel

A brochure describes more uses for vinyl-coated steel sheet in the construction of cabinets, appliances, and fixtures. (United States Steel Corp.)

For free copy circle No. 31 on postcard

Resistance Welding

A Vol. 5, No. 5, of "Resistance Welding at Work" presents a variety of case histories showing how production advantages and improved product quality came through use of resistance - welding techniques (Sciaky Bros., Inc.)

For free copy circle No. 32 on postcard

Hydraulic Valves

A 20-page manual illustrates and describes the operation and use of a series of 3000-psi, pressure-controlled hydraulic valves. For relief, sequence, reducing, unloading, and counterbalance, they find wide use in hydraulic circuits of automated machine operations. (Rivett, Inc.)

For free copy circle No. 33 on postcard

Vacuum Lift Unit

A vacuum lifting system designed to handle flat sheets and curved surfaces is explained in a brochure. (Vac-U-Lift Co.)

For free copy circle No. 34 on postcard

Casters

A complete line of caster and wheel products of all types and for

all uses, with capacities up to 15,000 lb each, is illustrated and specified in a 60-page catalog. (Payson-Harris & Reed Inc.)

For free copy circle No. 35 on postcard

Copper-Alloy Tubing

A brochure presents a complete listing, together with applicable specifications and typical uses, of an expanded line of tube products of copper, copper - zinc, leaded brass, and tin brass. (Scovill Mfg. Co.)

For free copy circle No. 36 on postcard

Finishing Liquids

A new bulletin describes eleven special liquid compositions for buffing and coloring operations. (Fred-eric B. Stevens, Inc.)

For free copy circle No. 37 on postcard

Mobile Crane

Various modifications of a mobile crane are illustrated and described in a two - page bulletin. (Hughes-Keenan Corp.)

For free copy circle No. 38 on postcard

Floodlights

A 184-page bulletin is a pocket-sized edition of a company's Floodlight Catalog. It lists a complete line of all types of floodlights and includes selection information. (Crouse-Hinds Co.)

For free copy circle No. 39 on postcard

Metallograph

The Reichert MEFLAB (German), an inexpensive metallograph for visual observation, photomicrography, and projection, is described in a four-page brochure. It provides magnifications from 32x to 2200x. Design features are described in detail. (William J. Hacker & Co., Inc.)

For free copy circle No. 40 on postcard

Testing Machines

A catalog contains illustrations and brief descriptions of 73 testers of all types. A custom service is also advertised. (Custom Scientific Instruments, Inc.)

For free copy circle No. 41 on postcard

THE IRON AGE, September 17, 1959

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, 1959

THE ONES THAT WILL LAST (and last, and last!)? THOSE MADE OF WEIRKOTE® ZINC-COATED STEEL

Laboratory salt-spray tests prove it. Leading manufacturers prove it. Experience proves it. Primary window frames and storm and screen frames of Weirkote zinc-coated steel last and last and last—literally shrug off the elements!

Weirkote will not give in to corrosion invasion because its zinc coat clings tightly to its steel surface year after year. Reason? Zinc and steel are actually integrated by Weirkote's continuous process.

This extra protection pays off when it comes to fabricating Weirkote, too. You can crimp it, twist it, torture it—work it to the limits of the steel itself—without chipping or flaking its surface. And this pays off in your pocketbook: No more costly rejects, and coating after fabrication can be eliminated.

Whether you're talking profit or product, there's a lot to be said for Weirkote zinc-coated steel. Write today for a free booklet that tells all about it. Weirton Steel Company, Dept. A-14, Weirton, West Virginia.



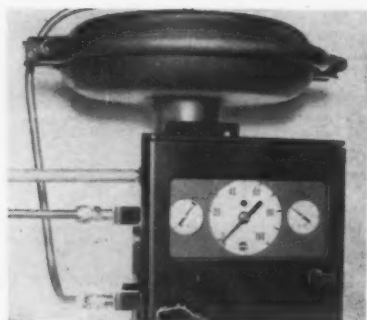
**WEIRTON STEEL
COMPANY**

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION

New Materials and Components

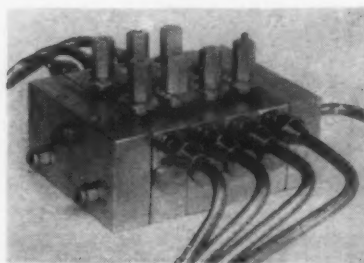


Unit Indicates-Controls and Positions Valves

A two-in-one unit functions as: (1) an indicating pneumatic controller for temperature or pressure, and (2) a valve positioner, amplifying air power for accurate, rapid positioning of a pneumatic control valve. Mounted close to the process and the controlled valve, it cuts transmission lags and gives preci-

sion and speed in positioning. Control modes are proportional, or two-position with differential gap—both adjustable 0 to 75 pct. Pressure elements cover the range 30 in. Hg vacuum to 10,000 psi. (United Stages Gauge Div., American Machine & Metals, Inc.)

For more data circle No. 42 on postcard, p. 125

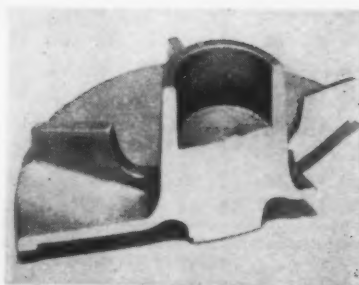


Spots Blockages in Centralized Lubrication

A new unit simplifies trouble indication in centralized oil and grease systems. Previous indicators required replacement of rupture disks. This reset indicator, available in a spring-pressure range from 250 to 2500 psi, pinpoints blocked line conditions. Protruding indica-

tor pins on separate units show, respectively, which outgoing line has high pressure, and which bearing line is blocked. When the condition is cleared, the pins retract to "normal" position. (Trabon Engineering Corp.)

For more data circle No. 43 on postcard, p. 125

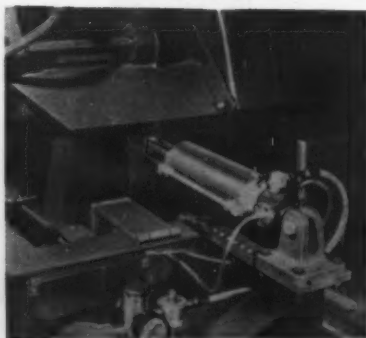


Oil-Sand Binder Improves Finish of Castings

An oil-sand binder based on the mineral attapulgite improves casting quality, especially nonferrous. Results with aluminum, magnesium, and bronze have been excellent. It enables precision castings with regular green sand equipment. As there is no steam to escape during pour-

ing, finer grades of sand can be used, producing castings with improved surface finish and reduced surface imperfections. Used with mineral oil and fine silica sand, it mulls quickly. (Minerals & Chemicals Corp. of America)

For more data circle No. 44 on postcard, p. 125



Pneumatic Feed Unit Has Various Uses

Designed principally for blade feed of cutoff saws of the same make, a pneumatic cylinder system, at the touch of a valve, advances the saw blade through the stock at a uniform rate and returns it to rest. An override control permits stopping the cycle and returning the blade to rest at any point. The uniform feed rate greatly reduces

blade wear and prolongs its life. Also, floor-to-floor time is cut, and operator fatigue is reduced. The unit can be mounted in any of eight positions for adjustment of saw-head movement, and advance and return speeds are separately adjustable. Other suggested uses are stock feeding to length, automatic feeding and ejection, and automatic

drill feeding. It comes in 6- and 12-in. strokes as installation kits. (Production Machinery, Inc.)

For more data circle No. 45 on postcard, p. 125

Tantalum Tubing

Thin-walled butt-welded tantalum tubing is now available as a stock item in OD's of 1, 1½, and 2 in., with wall thickness of 10, 13, 15, or 20-thousandths. (Haynes Stellite Co., Div. of Union Carbide Corp.)

For more data circle No. 46 on postcard, p. 125

Gold Aluminum Sheet

Nonfading gold-colored aluminum sheet, for architectural and other purposes, is available in a broad range of sizes and embossed finishes. Not produced by dye or other agent, the color is inherent in the alloy itself, and brought out by anodizing. Thus it is sunfast, and color matching is insured. (Kaiser Aluminum & Chemical Corp.)

For more data circle No. 47 on postcard, p. 125

Fluid/Gas Filter

New high-pressure filters can operate to 1000 psi and 275°F. For use in pneumatics or hydraulics, they effectively filter fuel, oils, and all hydraulic fluids, plus air and gases. Various filtering media can be used, affording filtration from 2 to 25 microns. An internal relief valve is included. (Purolator Products, Inc.)

For more data circle No. 48 on postcard, p. 125

Check Valves

Featuring low back pressure, fast action, and great versatility, check valves built for 3000 psi in air, oil, and water have a standard cracking pressure of 0.5 psi, with higher and lower cracking pressure available on order. Disk-type, they are very sensitive to reversal of flow. (Bodnar & McDermott Mfg. Co.)

For more data circle No. 49 on postcard, p. 125

Zinc Plating Anodes

A new type of anode for zinc plating is cast in a modified oval form, providing about 20 pct more

ALLEN

The cost of ALLEN Hex-Socket Cap Screws is only a minor fraction of your assembly costs... be sure you're getting the timesaving, cost-saving advantages of genuine Allens!

Ever since Allen first produced the hex socket head screw nearly fifty years ago, specifying *genuine* Allens (made by Allen of Hartford) has been a sure way to guarantee dependable threaded fastening.

Only *genuine* Allens have Leader Points that make starting easier, and greatly minimize danger of cross threading. *Genuine* Allens are "pressur-formd" to preserve the long fibers uncut throughout the length of the screw, giving stronger sockets for greater tightening torque.

Write for samples and engineering data. See how *genuine* Allens will make your product better.



Allen's new 1960 Series Socket Head Cap Screws give up to 2½ times more load carrying capacity, without indentation.



Head diameter of sizes from ¼" up is now uniformly 1½ times the body diameter—providing more under-the-head bearing surface, and a proportionate increase in clamping force. Write for new Bulletin G-25, with full specifications.

Stocked and sold by leading Industrial Distributors everywhere

ALLEN
MANUFACTURING COMPANY
Hartford 1, Connecticut



DESIGN DIGEST

surface area than standard ball anodes, yet allowing it to roll easily into a curved hanger basket or backfeed chute for automatics. (Allied Research Products, Inc.)

For more data circle No. 50 on postcard, p. 125

Belts and Pulleys

A line of positive-drive belts and pulleys combines the advantages of

chain and gear with those of the belt. Molded teeth on the belt make positive engagement with mating axial grooves on the pulleys. These positive drives are available on drives up to 600 hp and with speeds from 100 to 10,000 fpm. (Worthington Corp.)

For more data circle No. 51 on postcard, p. 125

Masking Coating

A protective coating has been developed which will seal metal

and stainless-steel surfaces against the biting and cleaning effects of pickling and passivating. Black in color, it can be applied by brushing, spraying, stenciling, dipping, or any other conventional method. Requiring no mixing or additives, it is easy to use, and can be easily stripped off. (Consolidated American Services, Inc.)

For more data circle No. 52 on postcard, p. 125

Fixture Jacks

A line of fixture jacks provide adjustable-height clamping for pressure stops on milling fixtures, drill jigs, and other such devices. For adjusting to the irregularities of all milling operations, they are made with smooth, round heads, or with

New Invention Picks Up 40 Cu. Yd. Detachable Containers . . . 15-Ton Loads



Dinosaur picks up in excess of 30,000 pounds of granular material, white line inside container indicates load has not shifted.

DEMPSTER-DINOSAUR Handles Containerized Cargo, Waste and Raw Materials . . .

The newly developed DEMPSTER-DINOSAUR is a system of materials handling that employs giant containers up to 40 cubic yards and larger. It lends itself to any situation where bulk accumulations of raw materials, liquids, waste or finished products must be

handled. Since one truck and one driver can automatically pick up, haul and dump or set down a number of containers, the DINOSAUR easily does the work of several trucks.

Two models are available — one for tandem trucks, handles 30,000 pounds; the other, for single axle trucks, handles 22,000 pounds. Special off-the-road models are available for loads limited only by the capacity of the truck.

Free Booklet Offered

A free booklet which describes the operation of this new system in detail is offered by the manufacturer.

Mfd. By Patents Pending

DEMPSTER BROTHERS, Inc.

Dept. 1A-9, Knoxville 17, Tenn.



Container is shown locked into carrying position.



hardened-tool-steel, serrated gripping surfaces. Pin construction permits the jack to elevate without rotating. OD's of bushings are ground for press-fit. Jacking limits of the line range from 1½ to 3¼ in. (Jergens Tool Specialty Co.)

For more data circle No. 53 on postcard, p. 125

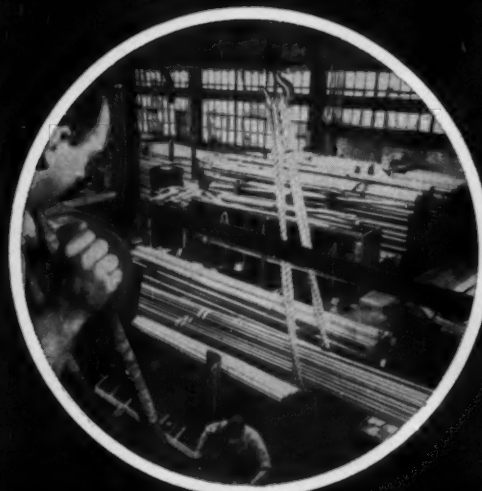
Hydraulic Pump

A Kingsbury slipper type hydraulic pump is designed for material-handling applications from ½ to 2 tons, capable of producing 1500-psi pressure and 1- to 2-gpm output with ease. The Kingsbury thrust bearing principle is used in the slippers, which support the load on a hydraulic oil film — giving minimum friction, quiet operation, and maximum dependability. (Mechanisms, Inc.)

For more data circle No. 54 on postcard, p. 125

Swivel Connector

A 90° swivel connector is capable of delivering hydraulic fluid at any angle under adequate pressure



AT THE CHASE BRASS & COPPER CO.

The STANLEY STEEL STRAPPING SYSTEM provides exceptional packaging flexibility

A wide range of product and package types, sizes, shapes and weights makes *packaging flexibility* mandatory. Chase Brass & Copper Co. achieves this *packaging flexibility* by using both manual and automatic STANLEY STEEL STRAPPING TOOLS and MACHINES to perform a variety of packaging jobs from bundling tubing, rod and pipe to securing coils of strip to pallets. An indication of the time and money saved is

this customer's report on the Stanley Power Electric Strapping Machine used to package up to 200 bundles of copper pipe per day . . . "has increased output up to 20% and reduced man-hours by almost 50%."

Write for Data Sheets to STANLEY STEEL STRAPPING, Division of The Stanley Works, Dept. I, 1317 Corbin Avenue, New Britain, Conn.

STANLEY

INSURE IT—SECURE IT WITH STANLEY STEEL STRAPPING

STANLEY

REG.—U.S. PAT. OFF.

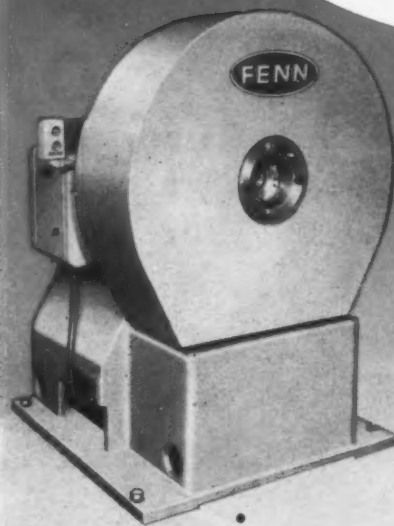
AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

This famous trademark distinguishes over 20,000 quality products of The Stanley Works, New Britain, Conn.—hand tools • electric tools • builders hardware • industrial hardware • drapery hardware • automatic door controls • aluminum windows • stampings • springs • coatings • strip steel • steel strapping—made in 24 plants in the United States, Canada, England and Germany.

In Canada: Steel Strapping Division, The Stanley Works of Canada, Ltd., Hamilton, Ontario

Only Fenn MAKES ALL TYPES OF SWAGING MACHINES

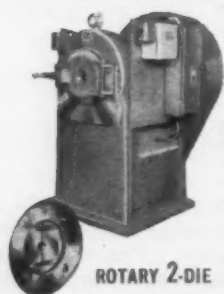
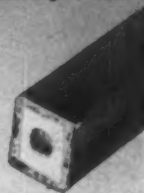
More and more precision metal forming operations are being performed on swaging machines because of low initial and low operating costs plus substantial savings in metals. Whether your specifications call for pointing, forming, assembling, internal reduction, or swaging squares and rectangles only Fenn offers you the model and size to exactly meet your requirements because only Fenn makes all types of swaging machines. Write for Fenn Swaging Catalog!



New! STATIONARY DIE SWAGING MACHINE

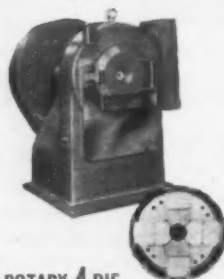
Newest addition to the most complete line of swaging machines. Ideal for use where it is desirable to keep work from rotating such as in swaging square and rectangular shapes. Inherent construction provides quieter operation and minimum operator fatigue. Available in wide range of sizes.

Square shaped heating element formed on Fenn Stationary Die Swager. Note round center element surrounded by compacted ceramic insulation.



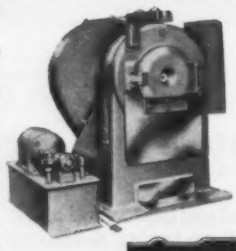
ROTARY 2-DIE

The workhorse of modern swaging machines and applicable to most swaging requirements. Low initial cost, wide range of sizes and capacities.



ROTARY 4-DIE

Ideal for swaging higher tensile materials, greater reduction per pass, and steeper angles of reduction. Also permits easy feeding.



HYDROFORMER

Equipped with special hydraulically actuated wedges that permit wide die opening. Used for internal and central reductions, and attaching fittings such as balls to cables.

FENN

Sets the Pace
IN SWAGING

THE FENN MANUFACTURING COMPANY • 305 FENN ROAD • NEWINGTON, CONN.

DESIGN DIGEST

—thus eliminating a common cause of hose failure due to extreme flexing. It will "follow" the travel of cranes, hydraulic presses, etc. Because it absorbs part of the swing, less and stiffer, longer lasting hose can be used, permitting cost savings in both cases. A variety of stem styles are available, in ½- to 1½-in. sizes. (Eastman Mfg. Co.)

For more data circle No. 55 on postcard, p. 125

Pneumatic Conveyor

A 40-hp combination negative and positive pressure conveying system is available in a package unit. It has a capacity of 10 to 15 tons per hour for soft feed materials and 15 to 20 tons per hour for larger-particle, free flowing substances. Dimensions are: height 10 ft, 6 in.; length 13 ft, 1½ in.; width 2 ft, 4 in. (Sprout, Waldron & Co., Inc.)

For more data circle No. 56 on postcard, p. 125

Barrel Medium

A new natural medium containing principally alumina and silica is usable in virtually any barrel-finishing operation now handled by aluminum oxide, quartz, or limestone. Crushed into random shapes, it is graded into sizes. As fast-cutting as aluminum oxide, it provides a finer finish. Being very dense, it wears evenly with little fracturing. It comes in 16 sizes, from 00 through 14. (Techline Div. of Wheelabrator Corp.)

For more data circle No. 57 on postcard, p. 125

Insulating Material

A 99-pct pure fused silica foam for insulation withstands 2200°F, and successfully resists shock from temperature cycling within extreme limits. In one test it was raised from 80° to 1000°F in 15 minutes, and then dropped to —100°F with no damage or breakdown. Lightweight and low-cost, it saves space, also, since thinner layers of this material can do the job than were required before. Great usefulness is pre-

dicted for this material in construction of environmental test chambers. (Pittsburgh Corning Corp.)

For more data circle No. 58 on postcard, p. 125

Filter Assemblies

Filters using ultrafine wire-mesh elements serve from 0 to 5000 psi, from -65° to 275°F, and offer positive "maximum particle passed" control. Permanent, cleanable, reusable stainless filter elements are offered for 98-pct removal ratings of particles 2, 5, and 10 microns in size. Withstanding 4500-lb differential pressures, the assemblies are offered with or without relief valve. They are recommended for hydraulics, lubricants, fuels, etc. (Aircraft Porous Media, Inc.)

For more data circle No. 59 on postcard, p. 125

Floor Resurfacer

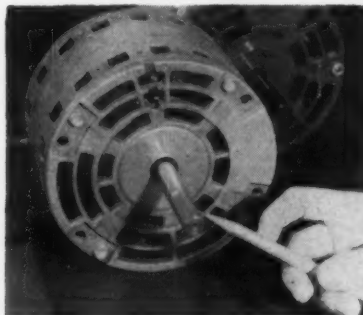
Consisting of fine steel particles in a plastic bonding agent, a floor resurfacer to restore damaged concrete floors withstands heavy trucking and resists grease, oil, alkalis,

and most acids. Easy to apply, it has high tensile, shear, and compressive strength. Gray in color, it comes in 1-gal quantities. (Dasco Chemical Co., Inc.)

For more data circle No. 60 on postcard, p. 125

Air-Moving Motor

A new 48-frame fractional-hp motor is designed primarily for the heating and air-conditioning industries. Length is up to ½ in. under



the previous design. Shaded-pole motors rate up to ¼ hp, and permanent-split-capacitor types up to ½ hp. A special lubricant material

provides at least five years' operation without lubrication. They are also designed for extra-quiet operation and versatility of mounting. (Westinghouse Electric Corp.)

For more data circle No. 61 on postcard, p. 125

Pipe-Repair Clamp

A stainless-steel pipe-repair clamp is lined with a Buna-N pad for quick and easy emergency or permanent repair of pipe leaks. It is made for pipe sizes from ½ to 8 in., in widths of 3, 6, 9, and 12 in. It will work for oil, gas, water, or steam pipes. (Marman Div., Aeroquip Corp.)

For more data circle No. 62 on postcard, p. 125

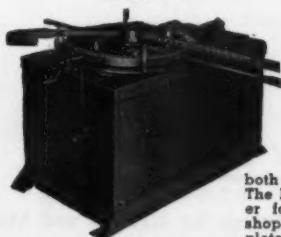
Spray Lube

A sprayed lubricant is applied under pressure to dies, die parts, or any metal surface. Adhering, it becomes virtually a part of the metal, and resists high temperatures, and corrosives. It is especially useful for hard-to-reach moving parts requiring

KARDONG FOUR-WAY BENDER

For Concrete Reinforcing Steel

Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes. Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1½-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar benders.

KARDONG BROTHERS, INC.

MINNEAPOLIS 13, MINN.



THE FINEST STANDARD
BRIGHT and HEAT TREATED
CAP SCREWS

AS WELL AS

PRECISION
MILLED - FROM - THE - BAR

CAP SCREWS • SET SCREWS • COUPLING BOLTS and STUDS

ARE PRODUCED BY

Wm. H. Ottmiller Co.
YORK, PENNA.

Precision Milled Specials? Or
Custom? We'll be glad to
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Announcing FIBRECOOL

THIS WATER-SOLUBLE
CUTTING FLUID HAS
EVERYTHING



FISKE'S FIBRECOOL will help you lower costs through heavier cuts, higher speeds and longer tool life. Produces better finishes in both cutting and grinding. It's "WORK PROVEN."

- TRANSPARENT, DOESN'T HIDE WORK.
- COOLS WHILE IT LUBRICATES.
- ACTUALLY PROTECTS FROM RUST.
- NO FOAMING, NO STICKING, NO GUMMING.

Bulletins describing Fiske's Fibrecool and other specialty lubricants and coolants, sent on request



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Punches & Dies



Since 1903

Made to highest standard and uniform quality thus insuring maximum service.

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Write Dept. B for catalog 60 and new stock list

GEO. F. MARCHANT COMPANY

1420-34 So. ROCKWELL STREET

CHICAGO 8, ILLINOIS

Wide or Narrow...



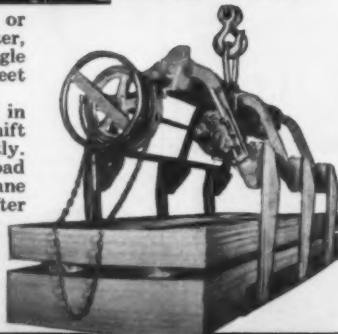
**1 C-F
LIFTER
HANDLES
THEM ALL**

Whether your production requires a few or many widths of sheet steel, 1 C-F Lifter, with its wide range of jaw and carrying angle adjustments will probably meet all your sheet handling requirements.

Adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes almost instantly.

Because it can pick up, carry and unload more loads per hour, using less man and crane time than any other method, a C-F Lifter will soon pay for itself.

Bulletin SL-30 gives you the complete story of C-F Lifter advantages to you. Ask for it today. There's no obligation.



CULLEN-FRIESTEDT CO.

1303 South Kilbourn Avenue • Chicago 23, Illinois

DESIGN DIGEST

ing lubrication. (Chemical Lubricants Co.)

For more data circle No. 63 on postcard, p. 125

Automatic-Solder Balls

Solder balls specially designed for automatic feeding production are available in various alloys to suit any specific temperature and strength requirement. Spherical, they can be loaded into jigs for automatic feeding. Available in diameters from 0.002 to 0.125 in., they insure a correct volume of solder and neat, accurate joints. (Alloys Unlimited, Inc.)

For more data circle No. 64 on postcard, p. 125

High-Temp Blind Rivet

A lock-spindle blind rivet is fabricated in materials that give improved strength up to 1000°F. Developed for stainless-steel and high-alloy applications, it consists of monel sleeve and locking collar and a stainless-steel pin. It is available in diameters of 1/8, 5/32, and 3/16 in., in 1/16-in. sleeve-length increments, to meet varied application requirements. (Huck Mfg. Co.)

For more data circle No. 65 on postcard, p. 126

NEW BOOKS

"Materials for Rockets and Missiles," by R. G. Frank and W. F. Zimmerman, presents engineering data on existing lightweight, high-temperature materials, and previews materials expected within the next few years. 124 pp. \$4.50 per copy. The Macmillan Co.

"Exploring Patternmaking and Foundry," by H. D. Miner and J. G. Miller, is an unusual combination of information on these related trades, intended as a text for beginners. Uses of the various tools and processes are completely described. 206 pp. \$4.85 per copy. D. Van Nostrand Co., Inc.

Lower your per unit stamping cost with

**AUTOMATIC
PRODUCTION**

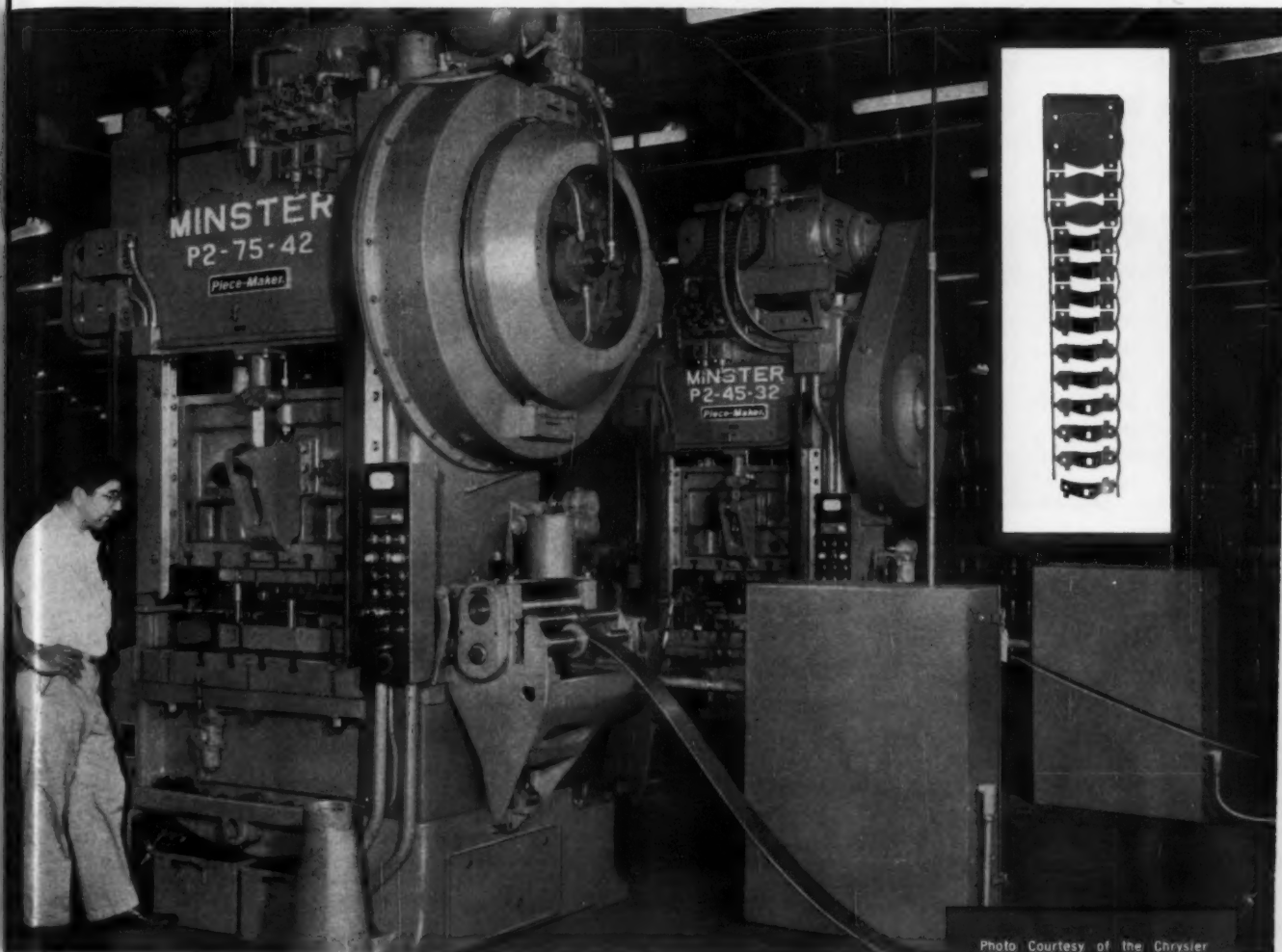


Photo Courtesy of the Chrysler Corporation, Indianapolis, Indiana.

Minster Piece-Maker® Presses

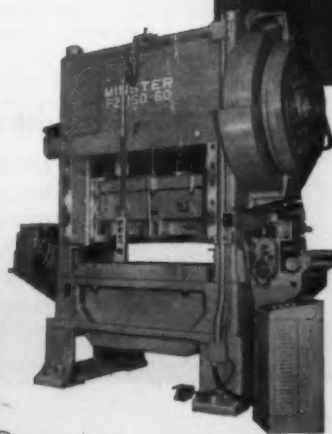
You get more parts per hour at a lower unit cost when you produce stampings automatically. Costs shrink as you eliminate expensive rehandling and storage of parts between operations.

Minster offers a complete range of press types and sizes for all kinds of profitable automatic production . . . long runs, short runs, big parts or tiny parts.

The right Minster press, with feed equipment matched to both press and job, can lower your unit costs, give you maximum productivity. Want more facts? Write or call us today.

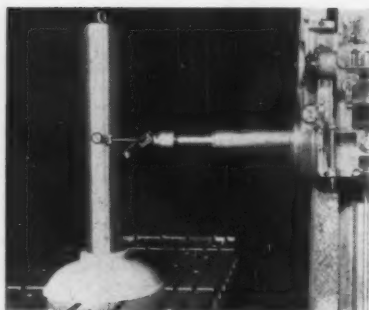
The Minster Machine Company • Minster, Ohio

MINSTER®



Minster Piece-Maker automatic production presses are designed for rigidity and built with precision. From 20 to 300 ton capacity.

New Equipment and Machinery

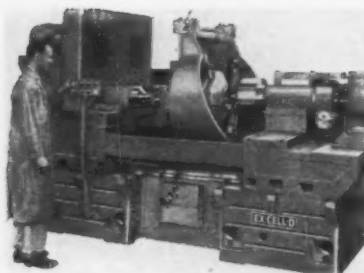


Simplifies Vertical Alignment of Machines

A new tool simplifies vertical alignment of machine tools. It is an accurate vertical machined-steel column on a large base (to overcome table surface irregularities). Placed on a machine-tool table, it serves as a reference for checking alignment of vertical and

horizontal spindles, headstocks, columns, end supports, and other machine components, using dial indicators. Accurate to 0.0002 in. per ft, it comes in heights of 36, 48, and 60 in. (Davis Div., Giddings & Lewis Machine Tool Co.)

For more data circle No. 66 on postcard, p. 125



Rugged, Powerful Boring Machine Works Fast

A boring machine has the power and rigidity to rough out metal 20 cu in. per minute. For instance, several diameters can be rough-bored at once with 1/4-in. cuts, then faced with equally deep cuts. A 15-to-1 reduction unit on a 20-hp motor achieves the torque required

at the low cutting speeds. The table then travels in the other direction to perform other boring and chamfering operations. This machine can finish-bore to close limits, or rough-and finish-bore in one cycle. (Ex-Cell-O Corp.)

For more data circle No. 67 on postcard, p. 125

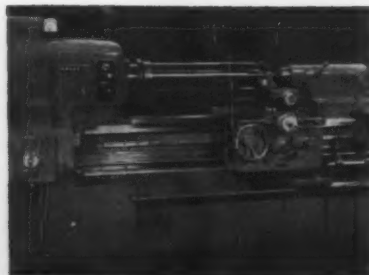


Rolls Shapes on Both Sides in One Pass

Designed for production metal fabricating plants, a duplex-type roll forming machine can realize time savings over 50 pct by forming both sides of a sheet in one pass. It uses two 10-station units with 24-gage capacity. One unit is movable to take various sheet widths from

10 to 40 in. Forming speeds to 120 fpm are possible. Originally built for a manufacturer of pipe, the machine can be used for such items as spray booths, partitions, building panels, and roofing forms. (The Lockformer Co.)

For more data circle No. 68 on postcard, p. 125



Lathe Attains Fine Finishes at 2000 sfpm

Designed to finish-turn rolls, cylinders, tubes, and like parts to critical finishes at speeds in excess of 2000 sfpm, a new lathe drastically reduces grinding and polishing requirements. Taper is held within 0.00025 in., concentricity to below 0.0005 in. Swinging 25 in. over the

bed and 16 in. over the cross-slide, the machine has a 72-in. center distance, with greater lengths available. Spindle speeds, with torque constant, run from 100 to 2200 rpm, indicated on a tachometer. (The Monarch Machine Tool Co.)

For more data circle No. 69 on postcard, p. 125

AGF HEAT TREATING PRODUCTION LINE AT HOLO-KROME INSURES UNIFORM TENSILE STRENGTH



POSITIVE ASSURANCE that every Holo-Krome socket screw will have correct tensile strength and a uniform distinguishing color, characteristic of quality heat treating, is embodied in the above AGF installation.

This **AUTOMATIC** production line consists of:

- (1) An AGF No. 240 Heating Machine which hardens the screws in a controlled atmosphere at the rate of 400 to 500 pounds per hour.
- (2) An AGF Conveyorized Quenching Tank.
- (3) An AGF No. 242 Heating Machine which tempers the work utilizing residual quenching oil remaining on the work pieces to produce an attractive black finish, which then discharges into
- (4) an AGF Conveyorized Quench Tank equipped with a vibrator discharge chute for removing the oil and carrying the work to the packaging operation.



HOLO-KROME features socket screw products having toughness as well as uniformity of hardness and strength. AGF Furnace equipment contributes to this high standard.

Your heat treating of fasteners or other small parts like stampings, screw machine products and precision castings can be accomplished with greater uniformity and quality control and at lower cost in AGF equipment.

PIONEER Furnace Engineers and experienced metallurgists at AGF will weigh your needs and make a proper recommendation without obligation.

Write today for the name of nearest AGF factory trained representative located in major industrial areas.

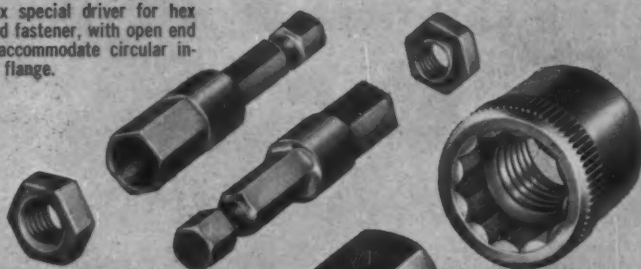
AMERICAN GAS FURNACE CO.

1034 LAFAYETTE STREET — ELIZABETH, N. J.



when your fastening job calls for
INTERNAL WRENCHING

Apex special driver for hex head fastener, with open end to accommodate circular inner flange.



APEX

INTERNAL WRENCHING TOOLS

STANDARD • MAGNETIC • SPECIAL

Apex special driver for internal wrenching nut with threaded hole.

Apex driver for socket screws. For #5 to 3" cap screws; #10 to 2" set screws. 3/4" to 1" female square drive adapters.



Apex one-piece power bit, to drive socket head screws. 1/4" to 3/8" hex shanks. For #5 to 1" cap screws; #10 to 1" set screws.

Apex male square inserts, for pipe plugs. 1/4" to 1" male square. 1/4" to 1" female square drive adapters.

Apex magnetic bit holder and insert bit, to drive socket head screws. Full range of standard and magnetic holders. Inserts for 1/4" to 1/2" cap screws; #5 to 3/4" set screws.

Write, on your company letterhead please, for

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CATALOG 30-B—Standard & Magnetic Nut Running Tools, 3/4" to 3 1/2" sq. dr.

CATALOG 30-C—Standard & Magnetic Screwdriving Tools

CATALOG 30-D—Miscellaneous Fastening Tools



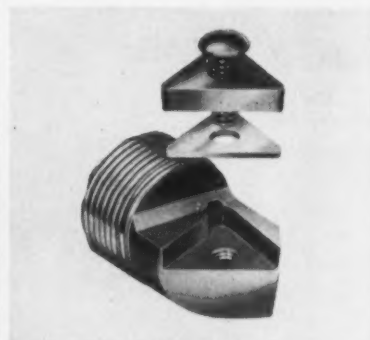
SCREWDRIVING • NUT RUNNING • SPECIAL

The APEX Machine & Tool Co., 1020 So. Patterson Blvd., Dayton, 2, Ohio

NEW EQUIPMENT

New Boring-Tool Setup

Precision at low cost comes to boring operations, thanks to a new development combining DeVlieg micrometrically adjustable Micro-bore cutting-tool holders with Kennametal Kendex carbide throwaway

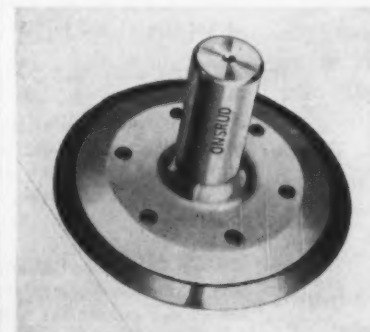


inserts. Indexable inserts can be used in the hardest carbide grade because brazing is not required. Thus users get the combined advantage of low-cost throwaway inserts and precision adjustability. (DeVlieg Machine Co.)

For more data circle No. 70 on postcard, p. 125

Honeycomb Mill Cutter

Designed for machining stainless-steel honeycomb core, a circular milling cutter uses a replaceable solid carbide ring attached to the cutter body. Attachment with screws assures no stress on the ring—an advantage over brazing—and



permits maximum resharpener before replacement. Available in eight cutting diameters from 1 to 8 in., these cutters are being successfully run at very high speeds. They produce a maximum burr of 0.005

Foote Bros. Drives In the METALWORKING INDUSTRY



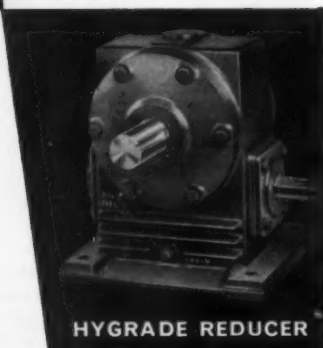
*Hot Stuff
Coming
Up On
Schedule*

This small Foote Bros. Hygrade Worm Gear Reducer is driving a quench tank conveyor in a large midwest heat treating plant. Parts from the heat treating furnace drop on the wire mesh belt, which moves them through an oil quench tank on a precisely determined time schedule.

To provide the proper quench and insure on-time delivery of parts to the customer, the operation of this conveyor is of critical importance. Though it was installed almost two years ago, the Hygrade Reducer has operated perfectly under tough working conditions.

You can see Foote Bros. Hygrade Worm Gear Reducers in capacities ranging from 168 HP down to $\frac{1}{8}$ HP, doing almost every kind of power transmission job in metalworking plants—from driving giant machines to powering small conveyors like the one shown here. The reason? Metalworking men *know* they can depend on Hygrade Reducers for the rugged stamina and reliability that has made them the buy-word in the industry.

There's a Foote Bros. unit available to meet your drive requirements. Your Authorized Foote Bros. Distributor is as close as your telephone. Ask him to recommend the right unit for your requirements. Find his name in your Classified Telephone Directory.



HYGRADE REDUCER

Hygrade Reducers of this type are stocked by your Authorized Foote Bros. Distributor. Ask him for STOCK PRODUCTS CATALOG SPA, which describes the complete line.

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FOOTE BROS. GEAR AND MACHINE CORPORATION • 4565 SOUTH WESTERN BOULEVARD • CHICAGO 9, ILLINOIS

THE IRON AGE, September 17, 1959

139

NEW EQUIPMENT

in., including foil thickness, which is well within specified tolerances. Stellite and high-speed rings are also available. (Onsrud Cutter Mfg. Co., Inc.)

For more data circle No. 71 on postcard, p. 135

Oil-Groove Grinder

A machine grinds oil grooves into both thrust faces of hardened

transmission gears at a rate of 800 to 1350 parts per hour, depending on gear size. The machine is fully automatic, including wheel dressing and compensation for wheel wear. A rotating spur-type feed wheel feeds parts and holds them as they are passed between the opposed grinding wheels. Only this feed wheel need be changed to take different gear sizes. Grinding-wheel feed slides and wheel dressers are adjustable for part width and

groove depth dimension. (F. Jos. Lamb Co.)

For more data circle No. 72 on postcard, p. 135

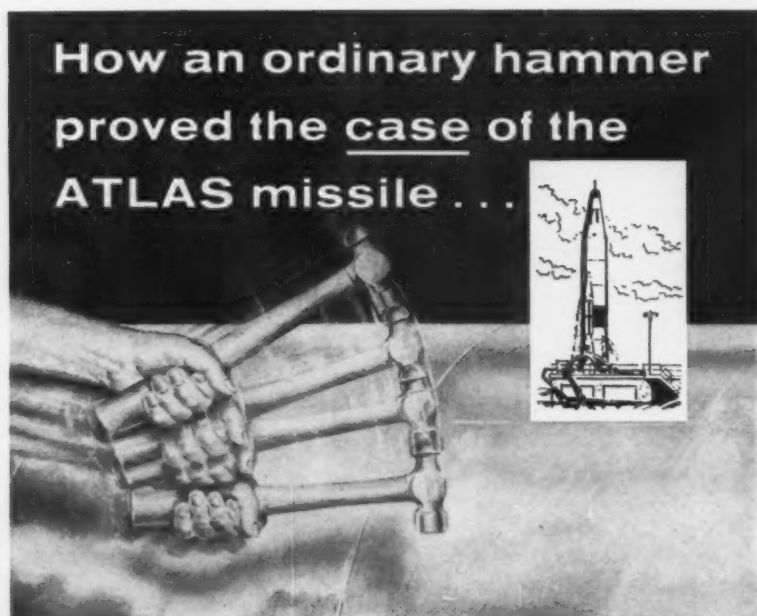
Electrostatic Painting

A new system for electrostatic painting atomizes and charges paint, which is electrically attracted to objects to be painted, because they are charged to opposite polarity. Articles being painted are carried past the atomizers on a conveyor. Width and density of the fan-shaped spray patterns is also electrically controlled. The process provides greater penetration of coating materials into cavities, eliminating touch-up operations. (Ionic Electrostatic Corp.)

For more data circle No. 73 on postcard, p. 135

8-Ton Punch Press

A low-priced 8-ton bench-model punch press has 7-in. shut height and 5-in. throat as standard, with larger dimensions available on order for larger work. This makes it unnecessary to buy heavier presses to



The body of the missile, essentially one big fuel tank, is similar in principle to an inflated football. Convair-Astronautics broke new ground in missile design by developing a super-strong structure with a comparatively thin stainless steel skin to keep weight to a minimum. This stainless steel skin is so thin that the interior has to be pressurized to preserve the shape of the body as propellants are consumed in flight, or when the missile is being transported on the ground.

Some critics, however, thought the body was too fragile—"You could dent it with a hammer." So, recently, when the Scientific Advisory Board, engaged in a re-evaluation of all missile pro-

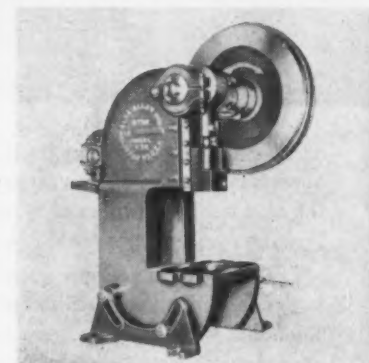
grams, arrived at Convair-Astronautics to take a reading on the ATLAS, they found that Convair had thoughtfully placed a number of hammers within easy reach of a finished missile. "Go ahead, bash it," invited Convair. The SAB members swung lustily. *Not a dent was registered*, for, although the walls are thin, the stainless has a minimum tensile strength of 200,000 psi.

This stainless steel skin material, supplied by Washington Steel, required extremely close control of mechanical properties and gauge tolerance which are regularly produced through Washington Steel's long experience with precision rolling equipment.

Stainless Steel—the Space Age Metal

Washington Steel Corporation

9-L Woodland Avenue
Washington, Pa.

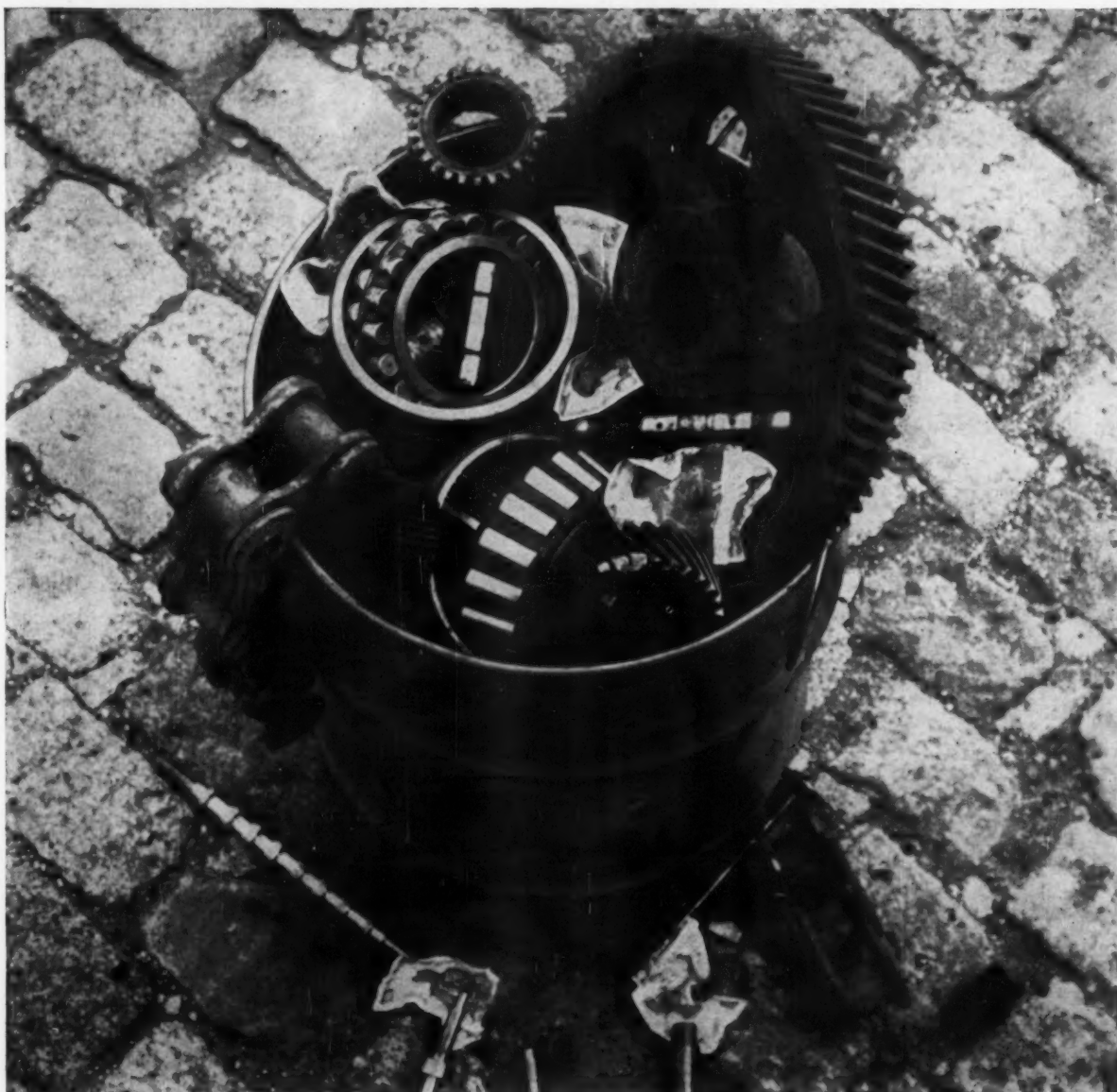


obtain sufficient die space. It can be set for continuous or single-stroke operation. Standard stroke is 1½ in., with other strokes available at extra charge. It requires a ½-hp motor. (Alva Allen Industries)

For more data circle No. 74 on postcard, p. 135

Tapping Attachment

Employed with great success on the Burgmaster line of turret drills, a tapping attachment features a supersensitive driving torque adjustment and a floating spindle which assures the high production of consistently perfect threads by operators of minimum skill. It can



TEXACO ORGANIZED LUBRICATION CAN HELP YOU...

End replacement parts waste

One Northeastern manufacturer replaced parts in a major machine every two weeks—a not uncommon practice in industry today. He marked it off as a normal maintenance expense. It wasn't really—it was the result of faulty lubrication practices. A Texaco Lubrication survey spotted the trouble—solved the problem. Now the manufacturer operates with a Texaco Organized Lubrication Plan—and the trouble no longer exists.

Chances are the same thing is happening in your plant right now—It doesn't

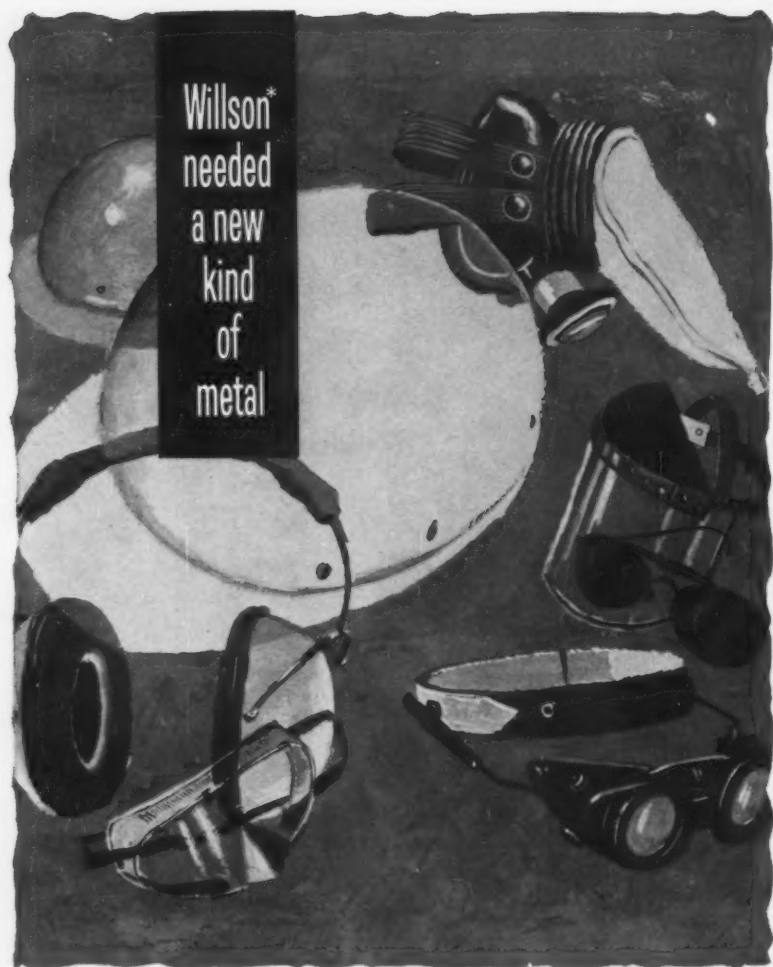
have to. A Texaco Organized Lubrication Plan can extend parts life significantly—saving thousands of dollars in replacement parts and even more in uninterrupted production for longer periods.

Get full details on Texaco Organized Lubrication from your local Texaco Lubrication Engineer. He can supply you with a copy of "Management Practices that Control Costs via Organized Lubrication." Or write:

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Riverside-Alloy produced it!

Men's lives depend on the equipment manufactured by Willson. And when an improved fabrication method was found, Willson planned a change-over. But they needed a new alloy for surest results. Five years passed before a single laboratory sample of the alloy was developed.

Then—where were the production facilities, technical experience and high quality standards required to produce commercial quantities? Willson naturally talked to Riverside-Alloy and the rest is history! Willson has its new alloy in quantity.

Riverside-Alloy has the nation's most advanced equipment and technology to produce sheet, strip, rod, wire and bars in all standard and special non-ferrous alloys. Write, now, for information on alloy problems you have under consideration. *Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.*

RIVERSIDE-ALLOY **PORTER** **METAL DIVISION**

H.K. PORTER COMPANY, INC.

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NEW EQUIPMENT

operate continuously at up to 2500 rpm with virtually no tap breakage. (Tapmatic Corp.)

For more data circle No. 75 on postcard, p. 125

File Reconditioner

Two new liquid products are used, respectively, to clean and sharpen files. After cleaning, the file is left in the sharpening sub-



stance for a length of time depending on its dullness. It comes out bright, sharp, and like new. (Kendall Laboratories)

For more data circle No. 76 on postcard, p. 125

Drills for Super Alloys

Designed for drilling aircraft and missile superalloys and high-strength steels, special drills work efficiently at high temperatures. Special point design provides good



penetration and thrust reduction. Made of 8-pct-cobalt high-speed steel with high vanadium content, they have short flutes for maximum rigidity. (National Twist Drill & Tool Co.)

For more data circle No. 77 on postcard, p. 125

Power Saws

Two new models have been added to a line of cutoff saws. They are

a 12 x 12-in.-capacity machine with full-automatic stock indexing, and a 12 x 16-in. model on which stock is manually fed. Controls are grouped for operation from either side. A job selector listing over 200 materials guides choice of blade, speed, feed, and coolant. An adjustable work-height selector elevates the cutting head automatically between cuts to just sufficient height

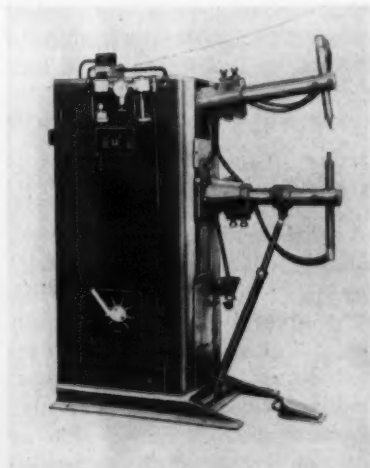


to clear the stock. Spring-loaded saw guides compensate for both band gage differences and band wear. Coolant is forced in the direction of band travel, insuring full flow into the cutting area. A slow approach selector insures proper start of cut. Many optional attachments facilitate a large variety of work. (The DoALL Co.)

For more data circle No. 78 on postcard, p. 125

Rocker-Arm Welders

Improved rocker-arm resistance welders rate from 10 to 75 kva, and have throat depths from 12 to 36



in. Timing sequence and heat adjustments provide for high-speed resistance welding of all types of

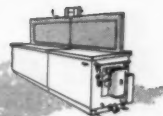
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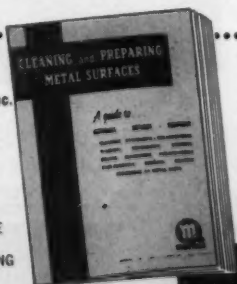
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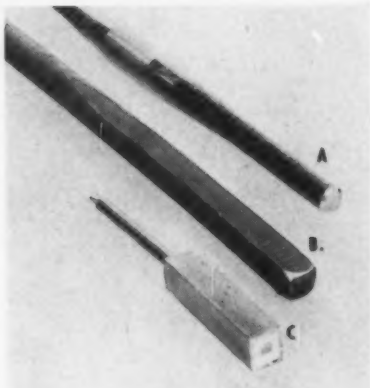
A WORLD-WIDE ORGANIZATION SPECIALIZING IN THE CLEANING AND PROTECTION OF ALL SURFACES.

NEW EQUIPMENT

metals. Coming in both air-actuated and foot-operated models, they are designed for long life and trouble-free operation. (Electric Arc, Inc.)
For more data circle No. 79 on postcard, p. 125

Stationary Die Swager

Pictured are examples of work done on a new stationary four-die swager: (a) tapered reduction of round, (b) round swaged to square



(same diameter), and (c) round tubing swaged to square (heating element filled with ceramic prior to swaging). Ideal for use where rotating the work is not desirable, it offers a more quiet operation and reduces operator fatigue. A range of sizes offers capabilities to swage solids from 13/32 to 3 3/8 in. and tubing from 1 to 6 in. Normal accessories are available. (The Fenn Mfg. Co.)
For more data circle No. 80 on postcard, p. 125



GOLD STAR SR

This d-c rectifier type welder does more things better than any other welder of its class because —

- a. Its new transformer (Miller designed and built) has integral flux diverter.
- b. Its new weld stabilized circuit delivers the ultimate in speed of metal deposition.
- c. Its new completely sealed semi-metallic rectifier — designed for welding — provides the most efficient d-c for welding ever devised.

These features contribute to the Gold Star SR's greater arc stability, denser welds, easy arc starting and flexibility to handle all electrodes in all positions.

Performance-proved wherever profits are important, the Gold Star SR is available in single and duplex models of 200 to 1200 amperes at 60% duty cycle ratings.



GOLD STAR

All-Weather
SRH

The features that set the SR above and beyond the normal standards of welder performance belong to the SRH also. But, in addition to the horizontal design for easier stacking and paralleling, this welder has an "all-weather" construction that includes baked varnish coated transformers and rectifiers plus phosphatizing and painting of all base and sheet metal — even fan blades. Cam-Lok receptacles are standard equipment. The Gold Star SRH welds real well.



Complete specifications on these Gold Star models will be sent promptly.

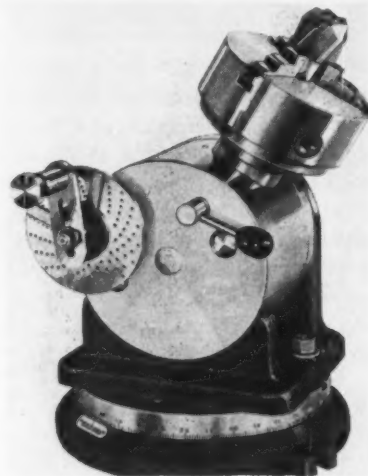
miller

ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN

• Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

Dividing Heads

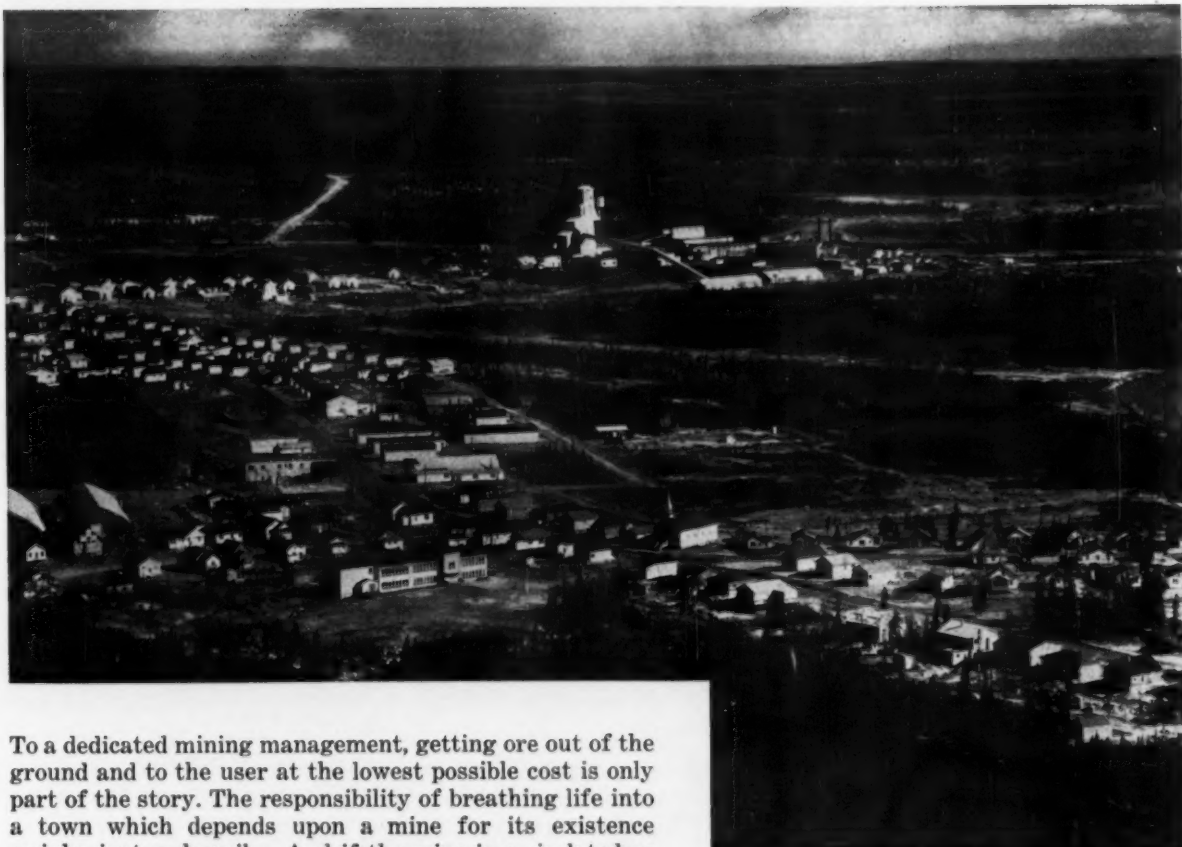
A new swivel base for all models of a line of dividing heads makes them fully universal. Each dividing head comes complete with three



index plates for dividing all numbers to 50 and even numbers to 100 except 96T. Right- and left-hand models are available. (L-W Chuck Co.)
For more data circle No. 81 on postcard, p. 125

Welding Gun

A lightweight automatic welding gun is designed especially for welding tubes to tube sheets. High weld strength is obtained without use of a filler metal. A small mandrel centers the gun in the tube, and the weld is made by a rotating tungsten electrode operating in an inert-gas atmosphere. It can be used for joining any two compatible metals. (Revere Copper and Brass Inc.)
For more data circle No. 82 on postcard, p. 125



To a dedicated mining management, getting ore out of the ground and to the user at the lowest possible cost is only part of the story. The responsibility of breathing life into a town which depends upon a mine for its existence weighs just as heavily. And if the mine is as isolated as Sherritt's nickel mine in Northern Manitoba, management must further provide all the tools the town needs to run itself happily . . . democratically . . . successfully.

Here at Lynn Lake a population of 2000 is supported by some 600 Sherritt people who work two nickel mines and a concentrating plant on a three-shift basis. But before this could be done, Sherritt had to move in all the facilities for an entire town . . . on tractor-pulled sleighs . . . over 165 miles of 20-degrees-below-zero wilderness. The great portage included 208 buildings—150 homes, a bank, a post office, a school, 2 churches—and a complete milling and concentrating plant. Two hydroelectric plants had to be built to provide power. And, later, a 150-mile railroad had to be built to handle the mines' output.

Today, Sherritt people at Lynn Lake turn out 2500 to 3500 tons of ore per day which is concentrated, then shipped to the company's refinery at Fort Saskatchewan 800 miles away. There it is refined to yield 35 tons of 99.8% pure nickel per day by people who also realize that getting the nickel out is only part of the job.

The Sherritt mines at Lynn Lake, Manitoba, yield a generous 2500 to 3500 tons of nickel-copper-cobalt ore per day.

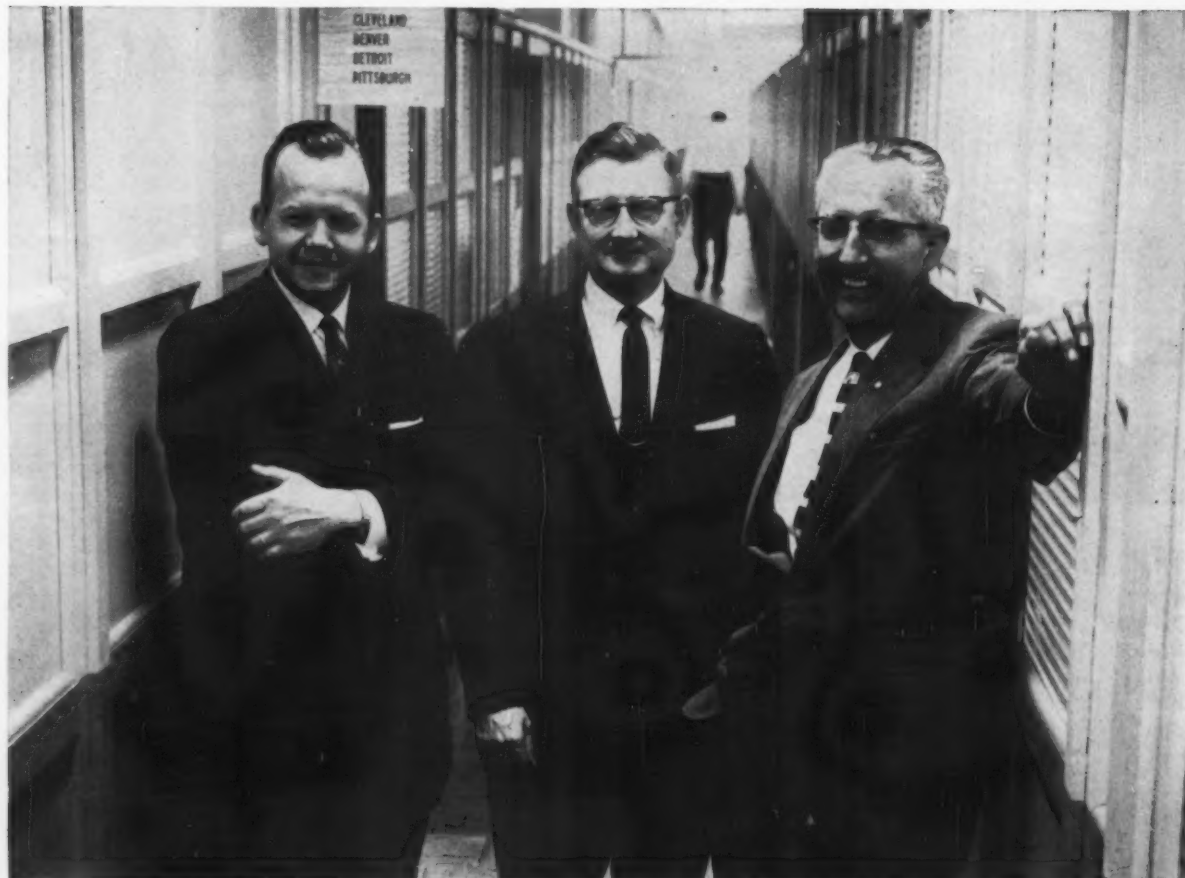
Getting the nickel out is only part of the job



FOOTE MINERAL COMPANY is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For product literature, prices, and delivery information, contact the Foote Mineral Company, 438S Eighteen West Cheltenham Building, Philadelphia 44, Pennsylvania.

SHERRITT GORDON MINES LIMITED

*Now the nation's
third largest
steel plate producer*



Left to right: George Copeland, Manager of Lukens' newly consolidated Sales Service Division, with department heads Arthur Powers of Customer Service, and Richard Slider of Order Processing.

LUKENS STREAMLINES ITS CUSTOMER SERVICES

The demanding process of making quality steel plate can't be rushed. But Lukens *has* cut the time it takes to process your orders and answer service inquiries.

In our *Customer Service Dept.*, for example, quotations, order status information, and similar requests are now handled by five area supervisors, each with a specific geographic territory to serve. All five are located in Coatesville. They and their staff members are ready to supply detailed information on any and all Lukens products—direct or through our sales offices.

Result: shortened lines of communication . . . faster action . . . greater customer satisfaction.

Equally important, our *Order Processing Dept.* has also been re-shaped. This one department now handles all orders for Lukens as well as for its Fabricating Division.

Streamlining our entire service organization was a logical complement to Lukens' "Phase A" expansion objectives: *new capacity and quality levels to meet the growing needs of our plate fabricating customers.*

Lukens Steel Company, Coatesville, Pa.

NEW CAPACITY ~ NEW QUALITY



SERVING INDUSTRY WITH A WIDE RANGE OF SPECIALTY CARBON, ALLOY, ARMOR AND CLAD STEEL PLATE • HEADS • PLATE SHAPES • PLATE-MATE WELDING ELECTRODES AND WIRE

The Iron Age Summary

State of Emergency Hits Users

Dwindling supplies and depletion of warehouse stocks are dangerously affecting steel users.

As the supply tightens, Taft-Hartley injunction seems more probable, but a fast settlement under the 80-day cooling off period is unlikely.

■ The steel supply emergency is here.

The severe, production-halting pinch may be two weeks away for some big users. But an emergency is inevitable in the face of fast-dwindling steel supplies and the drying up of some warehouse sources.

The state of emergency is reflected in some layoffs noted in the auto industry and among other big users, widespread interest in conversion deals, and skyrocketing prices of foreign and broker steel—now twice the mill price for some products and going higher.

Taft-Hartley Possible—The Taft-

Hartley 80-day cooling off period becomes more probable as the steel supply tightens. But a fast settlement under the 80-day injunction is no more likely than a settlement this week.

Invoking T-H would remove two of the strongest forces that are pressing for a settlement. These are: (1) Pressure from the rank and file on the union; and (2) pressure from steel users on the mills.

Supply Critical—The steel supply situation is now so critical that a shortage of some steel products is likely to extend six months after the strike is finally settled.

Since the start of the strike, steel users have used up about 10 million tons of inventory. This is nearly as much as was added in the first half. This liquidation puts steel stocks at about 14 to 15 million tons, or close to the low point of Jan. 1.

This means that with higher rates of production throughout the metal-working industry, the point has been reached where there is not

enough steel to sustain normal production.

Shutdowns Expected — Major users have enough steel to keep producing for several weeks. But there is now little chance that steel will reach them before they are forced to curtail operations.

For example, Chevrolet has enough steel to make 250,000 cars and trucks. But, at planned rates of production, this steel will be used before pipelines can be filled, even if the strike ends momentarily.

A fourth quarter crimp in almost all auto production is likely.

Emergency Procedures—This accounts for automakers' high interest in conversion deals. (This means buying ingots, slabs or other semi-finished steel from one source and shipping it to another mill to be rolled.) This is a very expensive process and is only resorted to in extreme emergency.

Meanwhile, operating mills are running into maintenance problems and will not be able to run at capacity much longer.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week	Last Week	Month Ago	Year Ago
Ingot Index (1947-1949=100)	22.0	20.4	20.4	110.2
Operating Rates				
Chicago	5.0	5.0	5.0	78.0
Pittsburgh	4.0	3.0	3.0	61.0
Philadelphia	12.0	12.0	12.0	73.5
Valley	10.0	10.0	10.0	52.0
West	0.0	0.0	0.0	79.0
Cleveland	0.0	0.0	0.0	57.0
Detroit	25.0	24.0	22.0	65.0
Buffalo	0.0	0.0	0.0	54.0
South Ohio River	70.0	70.0	59.0	74.0
South	12.0	10.0	12.0	54.0
Upper Ohio River	49.0	47.0	43.5	70.5
St. Louis	96.5	77.0*	80.0	72.0
Aggregate	12.5	11.5	11.5	65.6

*Revised

Prices At a Glance

	This Week	Week Ago	Month Ago	Year Ago
(Cents per lb unless otherwise noted)				
Composite price				
Finished Steel base	6.196	6.196	6.196	6.196
Pig Iron (gross ton)	\$66.41	\$66.41	\$66.41	\$66.49
Scrap No. 1 hvy (Gross ton)	\$41.50	\$40.83	\$39.83	\$43.17
No. 2 bundles	\$28.00	\$27.67	\$27.50	\$29.17
Nonferrous				
Aluminum ingot	26.80	26.80	26.80	26.80
Copper, electrolytic	30-31.5	30-31.5*	30.00	26.50
Lead, St. Louis	12.80	12.80	11.80	10.55
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.50	102.00	102.50	95.625
Zinc, E. St. Louis	11.00	11.00	11.00	10.00

Scale Price Increase Is Possible

Scale makers are keeping their eyes on the steel situation, fearing a boost in steel prices will cause them to follow suit.

At present deliveries are good despite rising backlogs, but will probably stretch out later.

■ Industrial scale makers are carefully watching the steel labor situation.

They fear a settlement boosting steel prices will require them to also raise scale prices. Half the scale manufacturers surveyed by IRON AGE felt there was a definite prospect of such increases.

Steel is Factor—"Our situation on prices cannot be determined until the effect of a strike settlement

on steel prices has been established," one scale builder says. Another reports, "Our prices during the balance of 1959 depend on any changes in steel prices." A third adds, "Some price increases are expected."

Buyers interested in avoiding any possible price hikes would do well to make purchases now. They'll find the current market to their liking.

Deliveries Good—Despite rising backlogs most manufacturers can still offer good deliveries on standard models of scales, generally in 3-4 weeks at most.

Here are some specific delivery schedules quoted by the manufacturers surveyed: Platform scales—immediate delivery on most models; instrument scales—delivery from stock; hanging scales—2 to 4

weeks; crane and hoist scales—2 to 6 weeks; motor truck scales—2 weeks; railroad track scales—8 weeks; bulk scales—8 weeks; and automatic batch scales—6 weeks.

Deliveries will probably stretch out later as most manufacturers are operating with increased backlogs. As the industry recovered from the 1958 recession scale makers had a busy first half.

Record Equalled—Production during the first six months of '59 was so good the industry equalled its record output, recorded in the first half of 1957. Shipments during the initial three months of 1959 were about 5 pct below the level of the same period in '57. But stepped-up demand in the second quarter helped push shipments equal with the record first half in 1957.

Individual manufacturers have improved orders as much as 70 pct above 1958 levels. First half shipments are as much as 50 pct better than those of the first half last year.

Future Looks Good—Scalemakers are confident about future sales prospects. Some predict a slight sales dip during the second half. But all are optimistic about the long-range outlook for their products.

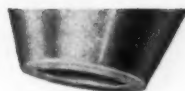
They point out the growing trend to greater use of electronics and automation in weighing. Another development expected to have increasing impact on the scale market: Complete weighing systems.

Changes Coming—One manufacturer sums it up this way: "Within a few years scale design will be largely concentrated on weighing devices that are incorporated into a complete system."

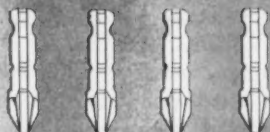


SOLID BOOST: Strong shipments of industrial scales in the first half of this year enabled scale makers to match record first half output recorded in 1957. (Photo from John Chatillon & Sons, New York).

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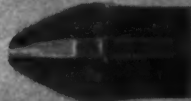


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Best comparable bit



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Precision control with the same Phillips master tools assures uniformly accurate fit of HY-PRO Phillips Bits and HOLTITE Phillips Screw recesses. Use this proved combination for the top efficiency you need in assembly—especially with power and automatic driving equipment—to avoid downtime, rejects, and weak fastenings. For full information, write: Continental Screw Co., 450 Mt. Pleasant St., New Bedford, Mass.

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INSERT BITS AND HOLDERS**

Supply Bind Grips Warehouse Users

Serious shortages develop in service center stocks as the supply drain continues.

Generally, they will be able to fill orders from regular customers for another two weeks or so.

■ The zero hour for warehouse steel users is near.

While service center stocks are not yet exhausted, critical shortages are showing up. Warehouse supplies are poorly balanced both in terms of location and consumption.

These developments highlight the supply crises:

Service centers will not fill orders for new customers or those located at great distances.

Many products are now sold on an allocation basis.

Previously, the larger warehouses could handle mill-size orders but wouldn't. Now they won't handle them because they can't. Most outlets are selling strictly in warehouse quantities in order to supply the most users.

Spot shortages of individual products are forcing users to improvise and substitute on orders. Substitutions include use of different sizes, heavier or lighter gages, or steel with another analysis.

Some service center steel isn't available because it's frozen in warehouses which are also struck. These include some outlets of U. S. Steel Supply, Jones & Laughlin, and Ryerson.

No Carload Lots—Service centers are making every effort to sup-

ply regular customers as long as possible. Generally, they will not sell steel in orders of carload lots or larger. They prefer to fill orders within normal warehouse quantities to supply as many buyers as they can.

"Our steel service centers can continue to take care of regular customers for normal tonnages within their regular trading areas through September with no great difficulty," says Robert Welch, American Steel Warehouse Assn. executive vice president. "Spot shortages are beginning to show up in structurals. The next to develop will be bars, plate, and sheet."

Area Analysis—Here's how the warehouse supply situation shapes up by areas:

Chicago: Probably the most critical section in terms of shortages. Cold-rolled and galvanized sheet stocks are wiped out. Hot-rolled sheet in gages 16 to 18 is very scarce. Structural and bar inventories are low. Some popular sizes of cold-finished bar are gone. Substitutions on orders for shapes and bar are frequent.

PURCHASING AGENT'S CHECKLIST

Iron ore shortage threatens in wake of steel strike. P. 63

Numerical controls gain popularity because of adaptations to short-run projects. P. 89

Tighter control of purchasing is needed when a company moves to automation. P. 103

Cincinnati: Supplies are available to keep warehouses open a few more weeks. Inventories of sheet, galvanized sheet, and light plate are about exhausted.

Detroit: Cold-rolled sheet supplies are very tight. There's broker activity in cold-rolled coils in sizes 36 in. and wider.

• **Pittsburgh:** Warehouses feel they can continue operating for about 2 to 4 more weeks on heavy products. The distributors are sticking to a policy of supplying only regular customers in normal trading areas with regular tonnages.

East Coast: There's a definite shortage of wide flange beams. However, standard structurals are still available. Construction companies are holding off building or "working around" shortages. Generally they don't want to pay the extra price for warehouse steel as compared with mill steel.

West Coast: Service centers still have good stocks. Inventories are usually about 30 days larger than those in other sections. Supplies are ample in stainless, aircraft quality alloys, tube, bar, sheet, tool steel, and cold finished bar.

Tinplate—Even if the steel strike ends Oct. 1, one producer believes it will take another nine months before steel mills catch up to tinplate demand. Right now tinplate inventories in canmaker hands are being used up at a rapid rate. Shortages are still two to four weeks away. But can companies are busy and expect sales to continue strong well into next year. Packers are getting in stocks of completed cans fearing a strike by the canmakers on Sept. 30.

Pipe and Tubing—All signs point to tight supply and strong demand for oil country seamless after the strike. At the moment oil producers are swapping pipe and looking for foreign steel. Stocks of pipe at downriver depots are running out. Mill backlogs, plus need for users to rebuild inventories, point to capacity operations by pipe makers for rest of the year.

COMPARISON OF PRICES

(Effective Sept. 15, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Sept. 15 1959	Sept. 8 1959	Aug. 18 1959	Sept. 16 1958
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.19	5.19	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	13.55	13.55	13.55	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Ternplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$10.65	\$10.65	\$10.65	\$10.30
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.00
Special coated mfg. ternes	9.90	9.90	9.90	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	\$5.75	\$5.75	\$5.75	\$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	\$80.00	\$80.00	\$80.00	\$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Sept. 15 1959	Sept. 8 1959	Aug. 18 1959	Sept. 16 1958
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	\$70.57	\$70.57	\$70.57	\$70.97
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.47
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb $\frac{1}{2}$	12.25	12.25	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	\$66.41	\$66.41	\$66.41	\$66.49
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$43.50	\$43.50	\$43.50	\$44.50
No. 1 steel, Phila. area	40.50	40.50	39.50	39.50
No. 1 steel, Chicago	40.50*	38.50	36.50	45.50
No. 1 bundles, Detroit	39.50*	38.50	37.50	36.50
Low phos., Youngstown	45.50	45.50	45.50	45.50
No. 1 mach'y cast, Pittsburgh	53.50*	52.50	52.50	51.50
No. 1 mach'y cast, Phila.	52.50*	50.50	50.50	49.50
No. 1 mach'y cast, Chicago	61.50*	60.50	59.50	53.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	\$41.50*	\$40.83	\$39.83	\$43.17
No. 2 bundles	28.00*	27.67	27.50	29.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$14.50-15.50	\$14.50-15.50	\$14.50-15.50	\$14.50
Foundry coke, prompt	18.50	18.50	18.50	18-18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30-31.50	30-31.50**	30.00	26.50
Copper, Lake, Conn.	31.50	31.50**	30.00	26.50
Tin, Straits, N. Y.	102.50†	102.00	102.50	95.625
Zinc, East St. Louis	11.00	11.00	11.00	10.00
Lead, St. Louis	12.80	12.80	11.80	10.55
Aluminum, virgin ingot	26.80	26.80	26.80	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

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Prices, Optimism: Both Show Gains

Many dealers look for at least a temporary end to the steel strike before very long.

And the possibility of an ore shortage is putting pressure on the prices for turnings.

■ Scrap prices continue to inch upward in many areas. Selective grades are showing price jumps of as much as \$2 or even \$3. More and more scrap traders are swinging to the theory that the steel strike will end shortly—even if only temporarily, through the Administration's use of the Taft-Hartley law.

The longer the strike continues, the shorter will be the remaining ore shipping season. For this reason, sentiment favors a strong turnings market when the strike ends. This is reflected in the Chicago market where all turnings grades rose \$2 this week.

The strong export market experienced by Coast ports in August is expected to carry over into September and an upward pressure on prices.

Pittsburgh—The market seems to be gaining strength here, although there is little new activity. Railroad lists showed most grades the same or higher. Prices outside the district are blocking off local consumers on all sides. Cast is very strong as movements away from Pittsburgh are cutting into the small local supply.

Chicago—Sharp advances in sheet clip prices and broker buying prices boosted the Chicago

market—despite some mill attempts to slow the advance. Turnings and steelmaking grades exhibited the greatest gains, but pricing is extremely stiff for all grades. A consumer survey of at least 35 yards indicates the average yard is about 65 pct full.

Philadelphia—The brisk export market of recent weeks hasn't shown any signs of weakening. Nearly 65,000 tons of scrap were shipped during August. This is believed to be a record for the port. While a drop in shipments is expected this month, it also looks like a good export month. For the most part, domestic scrap orders from operating mills in the area are nominal. Cast and foundry steel grades are very firm.

New York—Steelmaking grades have risen \$1 to a top of \$33 for No. 1 heavy melting as exporters hurry to cover orders. Their thinking is that the steel strike must end soon, and they expect heavy domestic scrap buying to make up for lost ore shipments.

Detroit—Dealer talk is very bullish. There reportedly is a good supply of scrap on the market and prices are remaining firm. Orders for cast grades have been coming in from Canada since early September to help bolster the local market.

Cleveland—Dealer and broker speculation, plus a few area operating mills, are keeping the market alive. Dealers generally are living off foundry business and have found a minor windfall in copper

shipments during the copper strike. Turnings are picking up some strength as dealers feel they will be needed for blast furnace feed at strike's end. If an ore shortage develops, even more will be needed.

St. Louis—Strong demand again pushed some scrap prices higher in this area. Supplies here are ample, but hope of higher prices has caused a tightening in scrap movement.

Cincinnati—There's little activity here as the strike continues. Dealers aren't interested in selling at offered prices. River shipments have dropped, but cast iron for foundries has picked up considerably.

Birmingham—Two Birmingham electric furnaces filled their September needs this week at prices \$2 a ton more than they last paid. Some foundry and railroad items also advanced. The advances, coupled with more scrap coming into the yards, caused dealers to part with some frozen scrap. Although there were not many buyers, larger tonnages were moving.


Buffalo—Despite a lack of activity, a general feeling of optimism prevails in the market. Prices are firm. Some dealers feel the end of the strike will bring a rise in prices. Others say mill inventories are high and mills may hold the line on prices once the buying starts.

Boston—A slight improvement in the market has brought a much better sentiment among dealers. Secondary steelmaking grades rose \$1 to \$2. And there was additional strength shown in the cast market.

West Coast—Prices all along the Coast are holding up. Mills now confirm they're stockpiling scrap in dealers' yards, awaiting the end of the strike. About six cargoes will leave Coast ports for Japan in October.

Houston—Export still dominates the mill-grade market with exporters quoting prices \$1 to \$5 a ton higher than domestic prices.

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DSC - Portsmouth
Long Production Run **LPR**  **COILS**



This 2210 lb. LPR Coil contains 45,464 ft. (8.6 miles) of No. 10 gauge Brite Basic Wire in one continuous length . . . Coil height—27"; I.D.—18"; O.D.—35".

WE QUOTE*

... Downtime frequency due to coil changes and setup adjustments decreased 50% to as much as 92.8%.

... Cumulative coil remnant scrap trimmed to the bone.

... Overall man-hour costs cut 15% to 20%.

... Small coil racks obsoleted.

... Self-supporting, also possessing greater density (weight per cubic foot), LPR's reduced storage area requirements, cut unloading time from 15% to 50%, increased all-around efficiency of material handling.

... Rid us of the bother and cost of caring for vendors' returnable carriers.

... Improved efficiency of our inventory management.

* Does Macy's tell Gimbel's?

When manufacturing costs are involved, it is contrary to our customer-relations principles to tell "Gimbel's what Macy's" is doing, without specific approval. We will, however, arrange to document any of these statements for bona fide Brite Wire users.

FOR THE RECORD—We introduced 1,200 pound Long Production Run Brite Wire coils in 1953. By 1958 we had demonstrated their practicability in weights up to about 4,000 pounds. Since 1957 we have been giving 3,000 pound LPR's the proving-ground treatment in our own Welded Wire Fabric operations . . . with substantial savings in overall handling and production costs . . . *We'll be glad to share our experiences with Brite Wire fabricators. We'll also help you stage conclusive trials on LPR's under your own wireworking conditions. You'll be the judge of their cost-reducing potentials. For more complete information call a DSC Customer "Rep" or write to Box 4308, Room 308, Detroit, Michigan.*



Detroit Steel Corporation

General Sales Office, Box 4308, Detroit 9, Michigan

DSC PRODUCTS: Coke . . . Coal Chemicals . . . Pig Iron
Basic Open Hearth Steel Ingots, Blooms, Slabs, Billets, Rods
HR and CR Sheet and Strip . . . Flat CR Spring Steel
Mfrs.' and H.C. Specialty Wire . . . Welded Wire Fabric

**The PROOF of DSC STEEL is in
its PERFORMANCE on YOUR job**

Customer "REP" Offices
in Principal Cities

Customer Satisfaction—Our No. 1 Job

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SCRAP PRICES (Effective Sept. 15, 1959)

Pittsburgh

No. 1 hvy. melting	\$43.00 to \$44.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	43.00 to 44.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	26.00 to 27.00
Low phos. punch'g plate	43.00 to 49.00
Heavy turnings	35.00 to 36.00
No. 1 RR hvy. melting	46.00 to 47.00
Scrap rails, random lgth.	56.00 to 57.00
Rails 2 ft and under	61.00 to 62.00
RR specialties	54.00 to 55.00
No. 1 machinery cast.	53.00 to 54.00
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	45.00 to 46.00
Stainless	
18-8 bundles and solids	230.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	\$40.00 to \$41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	40.00 to 41.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. forge crops	52.00 to 53.00
Low phos. punch'g plate	
1/4 in. and heavier	51.00 to 52.00
Low phos. 2 ft and under	49.00 to 50.00
No. 1 RR hvy. melting	45.00 to 46.00
Scrap rails, random lgth.	55.00 to 56.00
Re-rolling rails	63.00 to 64.00
Rails 2 ft and under	60.00 to 61.00
Angles and splice bars	54.00 to 55.00
RR steel car axles	60.00 to 62.00
RR couplers and knuckles	51.00 to 52.00
No. 1 machinery cast.	61.00 to 62.00
Cupola cast.	55.00 to 56.00
Cast iron wheels	48.00 to 49.00
Malleable	63.00 to 64.00
Stove plate	51.00 to 52.00
Steel car wheels	52.00 to 53.00
Stainless	
18-8 bundles and solids	215.00 to 220.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	115.00 to 120.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	\$40.00 to \$41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	20.00 to 21.00
Mixed bor. short turn.	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Shoveling turnings	24.00 to 25.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	44.00 to 45.00
Low phos. 2 ft punch'g/s.	45.00 to 46.00
Elec. furnace bundles	42.00 to 43.00
Heavy turnings	34.00 to 35.00
RR specialties	46.00 to 47.00
Rails 18 in. and under	61.00 to 62.00
Cupola cast.	40.00 to 42.00
Heavy breakable cast.	44.00 to 45.00
Cast iron car wheels	46.00 to 47.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	52.00 to 53.00

Cincinnati

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$35.50 to \$36.50
No. 2 hvy. melting	30.50 to 31.50
No. 1 dealer bundles	35.50 to 36.50
No. 2 bundles	25.00 to 26.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. 18 in. and under	46.00 to 47.00
Rails, random length	48.00 to 49.00
Rails, 18 in. and under	56.00 to 57.00
No. 1 cupola cast.	47.00 to 48.00
Hvy. breakable cast.	43.00 to 44.00
Drop broken cast.	55.00 to 56.00

Youngstown

No. 1 hvy. melting	\$44.00 to \$45.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	27.50 to 28.50
Machine shop turn.	18.50 to 19.50
Shoveling turnings	23.50 to 24.50
Low phos. plate	45.00 to 46.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	\$40.50 to \$41.50
No. 2 hvy. melting	33.50 to 34.50
No. 1 dealer bundles	40.50 to 41.50
No. 1 factory bundles	44.50 to 45.50
No. 2 bundles	24.00 to 25.00
No. 1 busheling	40.50 to 41.50
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	20.00 to 21.00
Cut structural & plates, 2 ft & under	46.50 to 47.50
Drop forge flashings	40.50 to 41.50
Low phos. punch'g plate	41.50 to 42.50
Foundry steel, 2 ft & under	40.00 to 41.00
No. 1 RR hvy. melting	44.00 to 45.00
Rails 2 ft and under	57.00 to 58.00
Rails 18 in. and under	58.00 to 59.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	56.00 to 57.00
No. 1 machinery cast.	54.00 to 55.00
Stove plate	51.00 to 52.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	215.00 to 225.00
18-8 turnings	115.00 to 120.00
430 bundles	115.00 to 120.00

Buffalo

No. 1 hvy. melting	\$33.00 to \$34.00
No. 2 hvy. melting	28.00 to 29.00
No. 1 busheling	33.00 to 34.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	17.00 to 18.00
Low phos. plate	40.00 to 41.00
Structurals and plate, 2 ft and under	41.00 to 42.00
Scrap rails, random lgth.	29.00 to 30.00
Rails 2 ft and under	49.00 to 50.00
No. 1 machinery cast.	50.00 to 51.00
No. 1 cupola cast.	46.00 to 47.00

St. Louis

No. 1 hvy. melting	\$36.00 to \$37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	25.00 to 26.00
Machine shop turn.	16.50 to 17.50
Shoveling turnings	17.50 to 18.50
Cast iron borings	20.00 to 21.00
No. 1 RR hvy. melting	41.00 to 42.00
Rails, random lengths	47.00 to 48.00
Rails, 18 in. and under	53.00 to 54.00
Angles and splice bars	48.00 to 49.00
RR specialties	46.00 to 47.00
Cupola cast.	54.00 to 55.00
Heavy breakable cast.	42.00 to 43.00
Stove plate	44.00 to 45.00
Cast iron car wheels	44.00 to 45.00
Re-rolling rails	59.00 to 60.00
Unstripped motor blocks	44.00 to 45.00

Birmingham

No. 1 hvy. melting	\$35.00 to \$36.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 special bundles	38.00 to 39.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	40.00 to 41.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	45.00 to 46.00
Structural and plate, 2 ft.	44.00 to 45.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	46.00 to 47.00
Rails, 18 in. and under	52.00 to 53.00
Angles and splice bars	44.00 to 45.00
Re-rolling rails	59.00 to 60.00
No. 1 cupola cast.	54.00 to 55.00
Stove plate	54.00 to 55.00
Cast iron car wheels	43.00 to 44.00
Unstripped motor blocks	42.00 to 43.00

New York

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$32.00 to \$33.00
No. 2 hvy. melting	28.00 to 29.00
No. 2 dealer bundles	21.00 to 22.00
Machine shop turnings	8.00 to 9.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Clean cast. chem. borings	22.00 to 23.00
No. 1 machinery cast.	27.00 to 28.00
Mixed yard cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 prepared solids	195.00 to 200.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$36.00 to \$37.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	36.00 to 37.00
Drop forge flashings	35.00 to 36.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Heavy breakable cast.	36.00 to 37.00
Mixed cupola cast.	45.00 to 46.00
Automotive cast.	50.00 to 51.00
Stainless	
18-8 bundles and solids	190.00 to 200.00
18-8 turnings	80.00 to 90.00
430 bundles and solids	85.00 to 95.00

Boston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$30.00 to \$31.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	37.00 to 38.00
Heavy breakable cast.	33.00 to 34.00

San Francisco

No. 1 hvy. melting	\$36.00
No. 2 hvy. melting	33.00
No. 1 dealer bundles	33.00
No. 2 bundles	22.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	47.00

Los Angeles

No. 1 hvy. melting	\$38.00
No. 2 hvy. melting	36.00
No. 1 dealer bundles	33.00
No. 2 bundles	\$18.00 to 20.00
Machine shop turn.	16.00
Shoveling turnings	18.00
Cast iron borings	18.00
Elec. turn. 1 ft and under (foundry)	47.00 to 48.00
No. 1 cupola cast.	46.00 to 47.00

Seattle

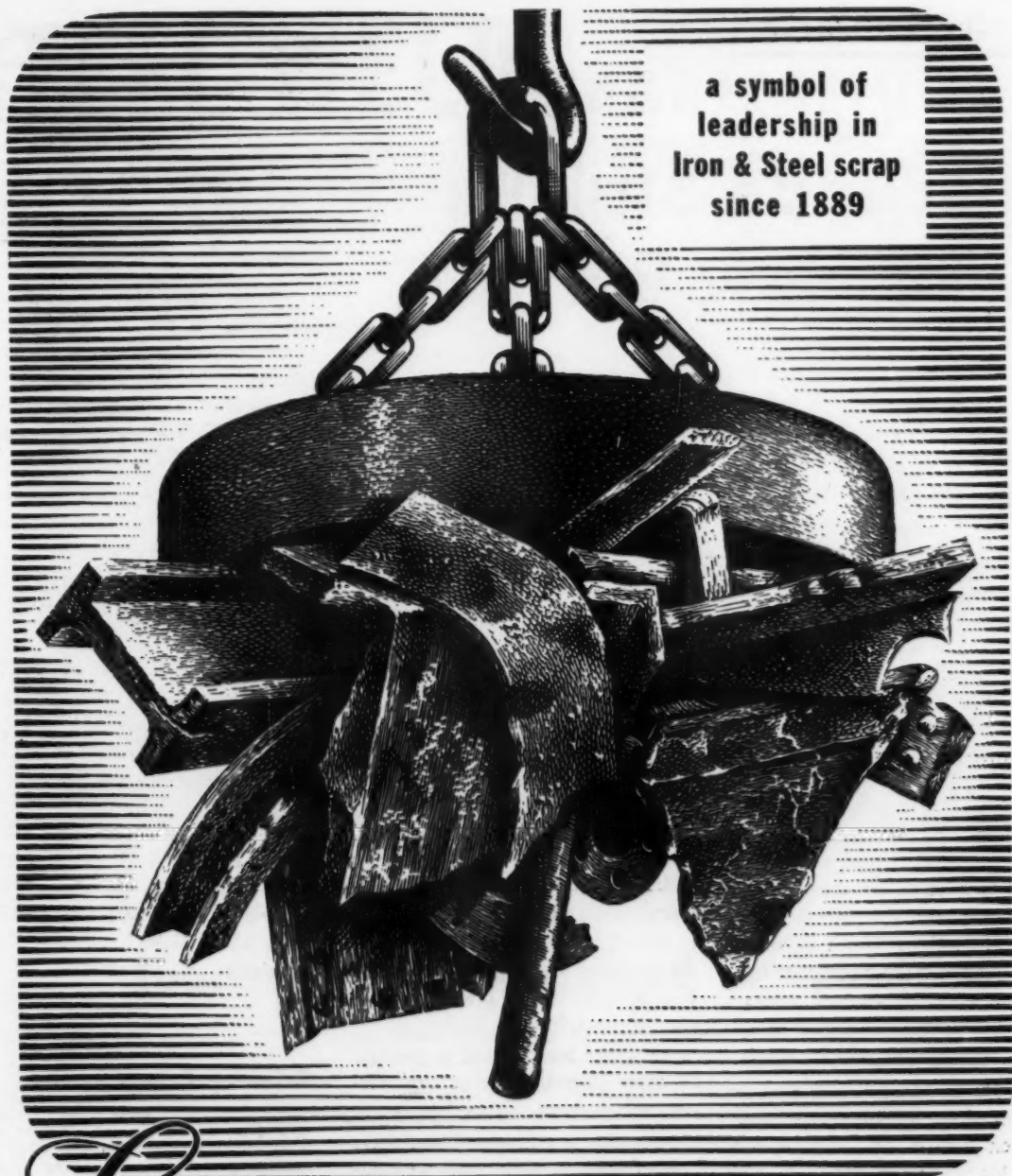
No. 1 hvy. melting	\$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$32.35
No. 2 hvy. melting	28.35
No. 1 dealer bundles	32.35
No. 2 bundles	22.75
Mixed steel scrap	24.35
Bush., new fact., prep'd.	32.35
Bush., new fact., unprep'd	36.35
Machine shop turn.	17.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Rails, re-rolling	37.00
Cast scrap	\$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	20.00
Machine shop turn.	16.00
Shoveling turnings	30.00
Cut structural plate 2 ft & under	\$45.50 to 46.50
Unstripped motor blocks	\$25.50 to 46.50
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	39.00 to 39.00



a symbol of
leadership in
Iron & Steel scrap
since 1889

Luria Brothers and Company, Inc.

MAIN OFFICE

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Philadelphia 7, Penna.

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IMPORT & EXPORT DIV. LIVINGSTON & SOUTHWARD, INC. 50 Broadway, New York, N. Y. Cable Address: FORENTRACO

Anaconda Strikers Make New Bid

The way Mine, Mill union American Brass locals settled has impressed western locals.

They've reconvened meetings with Anaconda with more realistic demands.

■ Settlement of American Brass Co. labor contracts in three eastern plants apparently does not constitute a pattern for parent Anaconda Co.'s other disputes with the same union.

Nevertheless, some of the calm negotiating sentiment that was present in the American Brass settlement is starting to show up in Anaconda negotiations in the West.

The International Union of Mine, Mill and Smelter Workers still has Anaconda's entire western operation closed down.

Came Down Some—The union local in Butte, Mont., asked for resumption of the meetings after they had been broken off, and immediately lowered its demands.

Sources close to the talks say the union demands are still out of line, but the company is apparently encouraged by the change in the union attitude.

American's settlement with Mine, Mill at its Torrington and Ansonia, Conn., plants and at Buffalo, calls for a 13¢ wage hike over two years.

Featherbedding an Issue—An Anaconda spokesman ruled out a settlement with Mine, Mill in the west on the same pattern because it would make some mines there marginal. Decreasing ore grades

and continuation of some of the labor practices would make them unprofitable unless copper prices hold at a fairly high level.

Regardless of the economic factors, some new management practices will be included in any pace-setting settlement. They will be aimed at doing away with "restrictive labor action"—in other words, featherbedding.

Reasons Why—One of the major producers says it must cut out featherbedding because:

(1) It had trouble cutting costs during the recent recession because of contract clauses "protecting outdated work methods."

(2) The benefits of some new labor-saving equipment are being lost because "rules prevent reduction of work force."

(3) Costs must be cut in the face of more severe domestic and foreign competition.

Says this producer, "Lines have been drawn in this year's negotiations, making the year 1959 a candidate for one of the bitterest in modern management-union relations. The outcome is still in doubt, but we should never stop telling our employees how important it is for their own welfare and security to eliminate costly featherbedding practices."

Strike Pressures—There are other reasons the Anaconda spokesman feels the two settlements will differ. Particularly, the loss of income by Anaconda miners in Montana is a greater influence on the economy

of the state. This, he believes, will put heavier pressure on the western arm of Mine, Mill to come to terms.

Nevertheless, predictions that the American Brass settlement could result in an improvement in attitudes still holds, and the Anaconda western settlement now appears closer.

Some Prices Move—On the copper market, the U. S. producers' price is apparently, but not actually, split. Of the Big Three, Anaconda is quoting 31.5¢ per lb. Phelps Dodge and Kennecott are holding at 30¢.

The difference is that Anaconda has some metal to sell. With two-thirds of its total production coming from Chile, the company has been able to scrape together some uncommitted metal.

The other two are closed up tight, and likely to stay that way until their strikes are settled. Kennecott has about one-third of its capacity in Chile, but it's all committed mostly to European buyers.

Tin prices for the week: Sept. 9—101.875; Sept. 10—102.00; Sept. 11—102.125; Sept. 14—102.375; Sept. 15—102.50.*

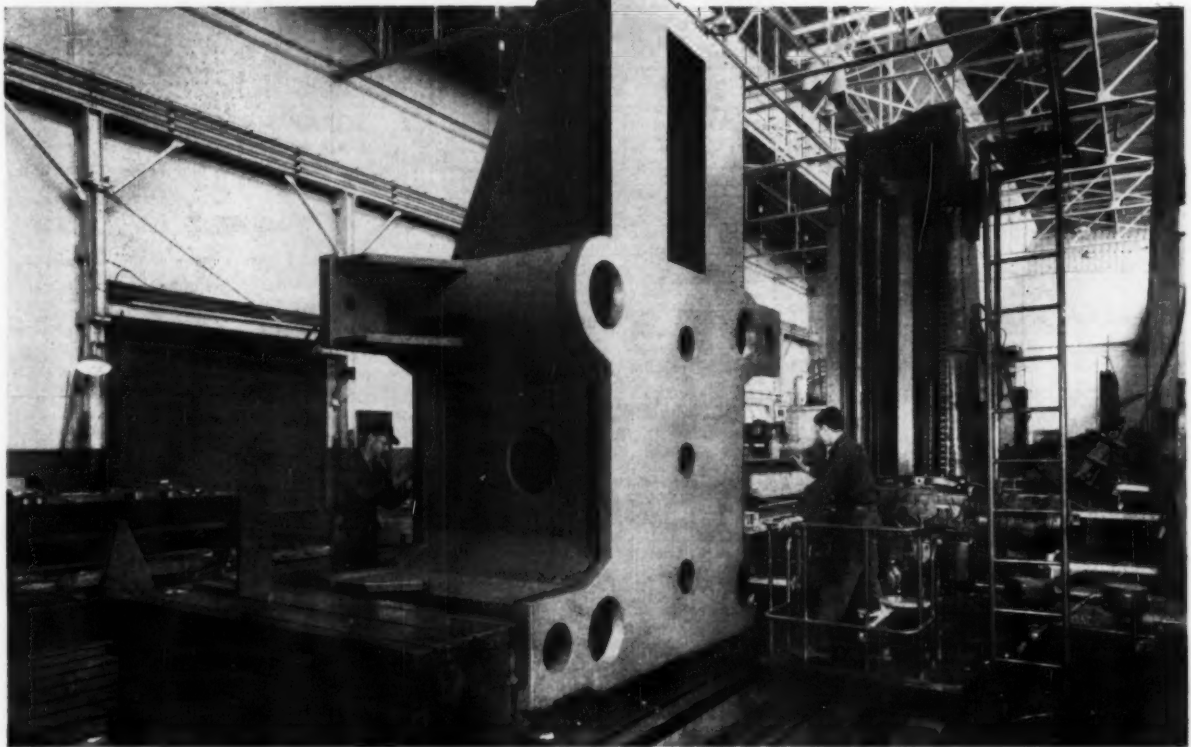
*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	34.70	34.00	8/1/59
Aluminum Ingot	25.00	25.10	8/1/59
Copper (E)	30-31.50	30.00	9/9/59
Copper (CS)	33.00	30.00	9/1/59
Copper (L)	31.50	30.00	9/9/59
Lead, St. L.	12.00	11.00	8/24/59
Lead, N. Y.	13.00	12.00	8/24/59
Magnesium Ingot	36.00	34.50	8/13/59
Magnesium pig	35.25	33.75	8/13/59
Nickel	74.00	64.00	12/6/58
Titanium sponge	160-160	162-162	8/1/59
Zinc, E. St. L.	11.00	11.00	2/25/59
Zinc, N. Y.	11.00	12.00	2/25/59

ALUMINUM: 99% Ingot **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig Velsco, Tex. **NICKEL:** Port Colborne, Canada. **ZINC:** prime western. **TIN:** See above. Other primary prices, pg. 158.

STEEL-WELD FABRICATION...



PRECISION WELDMENTS Fabricated and Machined to Specification!

The 40-Ton Press Bed, undergoing machining operations above, is typical of Mahon workmanship and capabilities in this field. It is one of thousands of Steel-Weld Fabricated parts and assemblies produced by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment.

When your design calls for weldments of any kind, you, too, will want to discuss your requirements with Mahon engineers; because, in the Mahon Company you will find a unique source for weldments or welded steel in any form... a fully responsible source with a long and enviable performance record, and unusual facilities for design engineering, fabricating, machining and assembling.

See Sweet's Product Design File for information on Facilities, or have a Mahon sales engineer call at your convenience.

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Use WELDED STEEL for
100% Predictability
and Greater Strength
with Reduced Weight!

MAHON

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136	.250-
				3.
1100, 3003	45.7	43.8	42.8	43.3
6062	53.1	48.4	46.9	46.0
6061-0	50.1	45.7	43.9	44.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	42.7-44.2	51.1-54.8
12-14	42.7-44.2	52.0-56.5
24-26	43.2-44.7	62.8-67.5
36-38	46.7-49.2	86.9-90.5

Screw Machine Stock—2011-T-3

Size"	3/4	5/8	1/2	3/8
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"	72	96	120	144
.019 gage	\$1.411	\$1.884	\$2.353	\$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type	Gage	.250	.250-	.188	.081	.032
		3.00	2.00			
AZ31B Stand, Grade		67.9	69.0	77.9	103.1	
AZ31B Spec.		93.3	95.7	108.7	171.3	
Tread Plate		70.6	71.7			
Tooling Plate		73.0				

Extruded Shapes

Factor	6-8	12-14	24-26	36-38
Comm. Grade, (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)	87.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting)	40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel Monel	Inconel
Sheet, CR	138	138
Strip, CR	124	138
Rod, bar, HR	107	109
Angles, HR	107	109
Plates, HR	130	126
Seamless tube	157	200
Shot, blocks	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.63	52.86	55.82	
Brass, Yellow	48.32	48.86	48.26	51.73
Brass, Low	51.28	51.82	51.22	54.59
Brass, R L	52.33	52.57	52.27	55.64
Brass, Naval	52.90	46.71	56.31	
Muntz Metal	50.95	46.26		
Comm. Br.	53.92	54.46	53.86	56.98
Mang. Br.	56.62	50.28		
Phos. Br. 5%	75.34	75.84		

Free Cutting Brass Rod... 33.86

TITANIUM

(Base prices, f.o.b. mill)

Sheet and strip, commercially pure, \$7.25-\$8.50; alloy, \$13.40-\$17.00. Plate, HR, commercially pure, \$5.25-\$6.00; alloy, \$8.00-\$10.00. Wire, rolled and/or drawn, commercially pure, \$5.75-\$6.25; alloy, \$7.75-\$10.00; Bar, HR or forged, commercially pure, \$4.25-\$5.00; alloy, \$4.25-\$7.50; billets, HR, commercially pure, \$3.55-\$4.10; alloy, \$3.55-\$5.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex., 29.50
Beryllium Aluminum 5% Be, Dollar per lb contained Be... \$74.75
Beryllium copper, per lb contained Be... \$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading... \$71.50
Blamuth, ton lots... \$ 2.25
Cadmium, del'd... \$ 1.30
Calcium, 99.9% small lots... \$ 4.55
Chromium, 99.9% metallic basis... \$ 1.31
Cobalt, 97-99% (per lb)... \$1.75 to \$1.82
Germanium, per gm, f.o.b. Miami, Okla., refined... \$3.30 to \$2.00
Gold, U. S. Treas., per troy oz... \$35.00
Indium, 99.9%, dollars per troy oz... \$ 2.25
Iridium, dollars per troy oz... \$75 to \$85
Lithium, 98%... \$11.00 to \$14.00
Magnesium sticks, 100 to 500 lb... \$9.00
Mercury, dollars per 76-lb flask f.o.b. New York... \$223 to \$225
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel... 69.60
Palladium, dollars per troy oz... \$18 to \$20
Platinum, dollars per troy oz... \$77 to \$80
Rhodium... \$120.00 to \$125.00
Silver ingots (\$ per troy oz)... \$1.375
Thorium, per kg... \$18.00
Vanadium... \$ 2.45
Zirconium sponge... \$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	
No. 115	30.75
No. 120	29.50
No. 123	28.50
80-10-10 ingot	
No. 305	35.00
No. 315	33.00
85-10-2 ingot	
No. 210	43.50
No. 215	39.25
No. 245	35.00
Yellow ingot	
No. 405	25.75
Manganese bronze	
No. 421	28.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	25.00-25.25
0.60 copper max.	24.75-25.00
Piston alloys (No. 132 type)	26.75-27.75
No. 12 alum. (No. 3 grade)	23.50-24.00
10% alloy	24.00-24.50
19% alloy	26.50-27.50
13 alloy (0.60 copper max.)	24.75-25.00
AXS-679 (1 pct zinc)	23.75-24.75

(Effective Sept. 14, 1959)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97 1/2%	24.00-25.00
Grade 2—92-95%	22.75-23.75
Grade 3—90-92%	21.75-22.75
Grade 4—85-90%	21.25-22.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27 1/2	26 1/2
Yellow brass	20 1/2	18 1/2
Red brass	24 1/2	23 1/2
Comm. bronze	25 1/2	24 1/2
Mang. bronze	19 1/2	18 1/2
Free cutting rod ends	19 1/2	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26 1/2
No. 2 copper wire	25 1/2
Light copper	23 1/2
*Refinery brass	24 1/2
Copper bearing material	24
*Dry copper content.	

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	27 1/2
No. 2 copper wire	25 1/2
Light copper	22 1/2
No. 1 composition	22 1/2
No. 1 comp. turnings	22 1/2
Hvy. yellow brass solids	17
Brass pipe	18
Radiators	18

Mixed old cast. Aluminum

Mixed new clips	14 —15
Mixed turnings, dry	16 1/2 —17
	14 1/2 —15 1/2

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 copper wire	24 1/2 —25 1/2
No. 2 copper wire	22 1/2 —23 1/2
Light copper	20 1/2 —21 1/2
Auto radiators (unsweated)	14 —14 1/2
No. 1 composition	18 1/2 —19
No. 1 composition turnings	17 —17 1/2
Cocks and faucets	14 1/2 —14 3/4
Clean heavy yellow brass	12 1/2 —13 1/2
Brass pipe	14 1/2 —15 1/2
New soft brass clippings	14 1/2 —15 1/2
No. 1 brass rod turnings	12 —12 1/2

Aluminum

Alum. pistons and struts	7 1/2 —8
Aluminum crankcase	11 1/2 —11 3/4
1100 (2s) aluminum clippings	15 —15 1/2
Old sheet and utensils	11 1/2 —11 3/4
Borings and turnings	7 —7 1/2
Industrial castings	11 1/2 —11 3/4
2020 (24S) clippings	12 1/2 —13

Zinc

New zinc clippings	4 1/2 —5 1/4
Old zinc	3 1/4 —3 1/2
Zinc routings	2 1/2 —2 3/4
Old die cast scrap	1 1/2 —2

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	30-32
Clean Monel turnings	20-23
Old sheet Monel	26-28
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed	15

Lead

Soft scrap lead	8 1/2 —9 1/4
Battery plates (dry)	4 1/2 —4 3/4
Batteries, acid free	2 1/2 —2 3/4

Miscellaneous

Block tin	77 —78
No. 1 pewter	59 —60
Auto babbitt	40 —41
Mixed common babbitt	30 —31
Solder joints	14 —14 1/2
Siphon tops	42
Small foundry type	10 1/2 —10 3/4
Monotype	10 1/2 —10 3/4
Lino. and stereotype	9 1/2 —9 3/4
Electrotype	7 1/2 —8 1/4
Hand picked type shells	6 —6 1/2
Lino. and stereo. dross	2 1/2 —3 1/4
Electro dross	2 1/2 —3 1/4

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL
PRICESBILLETS, BLOOMS,
SLABSPIL-
INGSHAPES
STRUCTURALS

STRIP

Carbon
Re-rolling
Net TonCarbon
Forging
Net TonAlloy
Net TonSheet
Steel

Carbon

Hi Str.
Low
AlloyCarbon
Wide-
FlangeHot-
rolledCold-
rolledHi Str.
H.R. Low
AlloyHi Str.
C.R. Low
AlloyAlloy
Hot-
rolledAlloy
Cold-
rolled

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			\$119.00 B3		5.55 B3	8.10 B3	5.55 B5						
	Buffalo, N. Y.	\$80.00 R3, B3	\$99.50 R3, B3	\$119.00 R3, B3	6.50 B3	5.55 B3	8.10 B3	5.55 B3	5.10 B3, R3	7.425 S10, R7	7.575 B3			
	Phila., Pa.									7.875 P15				
	Harrison, N. J.													15.55 C11
	Conschohocken, Pa.		\$104.50 A2	\$125.00 A2					5.15 A2		7.575 A2			
	New Bedford, Mass.									7.875 R6				
	Johnstown, Pa.	\$80.00 B3	\$99.50 B3	\$119.00 B3		5.55 B3	8.10 B3							
	Boston, Mass.									7.975 T8				
	New Haven, Conn.									7.875 D1				
	Baltimore, Md.									7.425 T8				15.90 T8
	Phoenixville, Pa.					5.55 P2		5.55 P2						
MIDDLE WEST	Sparrows Pt., Md.								5.10 B3		7.575 B3			
	New Britain, Bridgeport, Wallingford, Conn.			\$119.00 N8						7.875 W1, S7				
	Pawtucket, R. I. Worcester, Mass.									7.975 N7, A5				15.90 N7, 15.70 T8
	Alton, Ill.								5.30 L1					
	Ashland, Ky.								5.10 A7		7.575 A7			
	Canton-Macellon, Dover, Ohio		\$102.00 R3	\$119.00 R3, \$114.00 T5						7.425 G4		10.90 G4		
	Chicago, Franklin Park, Evanston, Ill.	\$80.00 U1, R3	\$99.50 U1, R3, W8	\$119.00 U1, R3, W8	6.50 U1	5.50 U1, W8, P13	8.05 U1, Y1, W8	5.50 U1	5.10 W8, N4, A1	7.525 A1, T8, M8	7.575 W8		8.40 W8, S9, I3	15.55 A1, S9, G4, T8
	Cleveland, Ohio									7.425 A5, J3		10.75 A5	8.40 J3	
	Detroit, Mich.			\$119.00 R5					5.10 G3, M2	7.425 M2, S1, D1, P11	7.575 G3	10.90 S1		
	Anderson, Ind.									7.425 G4				
	Gary, Ind. Harbor, Indiana	\$80.00 U1	\$99.50 U1	\$119.00 U1, Y1		5.50 U1, J3	8.05 U1, J3	5.50 J3	5.10 U1, I3, Y1	7.425 Y1	7.575 U1, I3, Y1	10.90 Y1	8.40 U1, Y1	
WEST	Sterling, Ill.	\$80.00 N4				5.50 N4	7.75 N4	5.50 N4	5.20 N4					
	Indianapolis, Ind.									7.575 R5				15.70 R5
	Newport, Ky.								5.10 A9				8.40 A9	
	Niles, Warren, Ohio Sharon, Pa.		\$99.50 S12, C10	\$119.00 C10, S1					5.10 R3, S1	7.425 R3, T4, S1	7.575 R3, S1	10.90 R3, S1	8.40 S1	15.55 S1
	Owensboro, Ky.	\$80.00 G5	\$99.50 G5	\$119.00 G5										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	\$80.00 U1, P6	\$99.50 U1, C11, P6	\$119.00 U1, C11, B7	6.50 U1	5.50 U1, J3	8.05 U1, J3	5.50 U1	5.10 P6	7.425 J3, B4, 7.525 E3			8.40 S9	15.55 S9
	Weirton, Wheeling, Follansbee, W. Va.				6.50 U1, W3	5.50 W3		5.50 W3	5.10 W3	7.425 W3	7.575 W3	10.90 W3		
	Youngstown, Ohio	\$80.00 R3	\$99.50 Y1, C10	\$119.00 Y1			8.05 Y1		5.10 U	7.425 Y1, R5	7.575 U1, Y1	10.95 Y1	8.40 U1, Y1	15.55 R5, Y1
	Fontana, Cal.	\$80.00 K1	\$109.00 K1	\$140.00 K1		6.30 K1	8.05 K1	6.45 K1	5.825 K1	9.20 K1				
	Geneva, Utah		\$99.50 C7			5.50 C7	8.05 C7							
	Kansas City, Mo.					5.60 S2	8.15 S2						8.45 S2	
SOUTH	Los Angeles, Torrance, Cal.		\$109.00 B2	\$130.00 B2		6.20 C7, B2	8.75 B2		5.85 C7, B2	9.30 C1, R5			9.60 B2	17.75 J3
	Minnequa, Colo.					5.80 C6			6.20 C6	9.375 C6				
	Portland, Ore.					6.25 O2								
	San Francisco, Niles, Pittsburg, Cal.		\$109.00 B2			6.15 B2	8.70 B2		5.85 C7, B2					
	Seattle, Wash.		\$109.00 B2			6.25 B2	8.80 B2		6.10 B2					
	Atlanta, Ga.					5.70 A8			5.10 A8					
	Fairfield, Ala. City, Birmingham, Ala.	\$80.00 T2	\$99.50 T2			5.50 T2, R3, C16	8.05 T2		5.10 T2, R3, C16		7.575 T2			
	Houston, Lone Star, Texas		\$104.50 S2	\$124.00 S2		5.60 S2	8.15 S2						8.45 S2	

(Effective Sept. 14, 1959)

IRON AGE

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STEEL
PRICES

	SHEETS								WIRE ROD	TINPLATE†		
	Hot-rolled 18 ga. & heavy	Cold- rolled	Galvanized (Hot-dipped)	Enamel- ing	Long Tone	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 B3	6.275 B3			7.525 B3	9.275 B3		6.40 W6	† Special coated mfg. terms deduct 35¢ from 1.25-lb. coke base box price, 6.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct \$2.20 from 1.25 lb. coke base box. * COKE: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.											
	Coatesville, Pa.											
	Conahohocken, Pa.	5.15 A2	6.325 A2			7.575 A2						
	Harrisburg, Pa.											
	Hartford, Conn.											
	Johnstown, Pa.								6.40 B3			
	Fairless, Pa.	5.15 U1	6.325 U1			7.575 U1	9.325 U1			\$10.50 U1	\$9.20 U1	
	New Haven, Conn.											
	Phoenixville, Pa.											
MIDDLE WEST	Sparrows Pt., Md.	5.10 B3	6.275 B3	6.875 B3		7.525 B3	9.275 B3	10.025 B3	6.50 B3	\$10.40 B3	\$9.10 B3	
	Worcester, Mass.								6.70 A5			
	Trenton, N. J.											
	Alton, Ill.								6.60 L1			
	Ashland, Ky.	5.10 A7		6.875 A7	6.775 A7	7.525 A7						
	Canton-Massillon, Ohio			6.875 R1, R3								
	Chicago, Joliet, Ill.	5.10 W8, A1				7.525 U1, W8			6.40 A5, R3, W8			
	Sterling, Ill.								6.50 N4, K2			
	Cleveland, Ohio	5.10 R3, J3	6.275 R3, J3	7.65 R3*	6.775 R3	7.525 R3, J3	9.275 R3, J3		6.40 A5			
	Detroit, Mich.	5.10 G3, M2	6.275 G3, M2			7.525 G3	9.275 G3					
WEST	Newport, Ky.	5.10 A9	6.275 A9									
	Gary, Ind. Harbor, Indiana	5.10 U1, I3, Y1	6.275 U1, I3, Y1	6.875 U1, I3	6.775 U1, I3, Y1	7.225 U1	7.525 U1, Y1, I3	9.275 U1, Y1	6.40 Y1	\$10.40 U1, Y1	\$9.10 I3, U1, Y1	7.85 U1, Y1
	Granite City, Ill.	5.20 G2	6.375 G2	6.975 G2	6.875 G2						\$9.20 G2	7.95 G2
	Kokomo, Ind.			6.975 C9					6.50 C9			
	Mansfield, Ohio	5.10 E2	6.275 E2		7.225 E2							
	Middletown, Ohio		6.275 A7	6.875 A7	6.775 A7	7.225 A7						
	Niles, Warren, Ohio Sharon, Pa.	5.10 R3, S1	6.275 R3	6.875 R3, 7.65 R3*	6.775 S1	7.225 S1*, R3	7.525 R3, S1	9.275 R3			\$9.10 R3	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 U1, J3, P6	6.275 U1, J3, P6	6.875 U1, J3, 7.50 E3*	6.775 U1	7.525 U1, J3	9.275 U1, J3	10.025 U1, J3	6.40 A5, J3, P6	\$10.40 U1, J3	\$9.10 U1, J3	7.85 U1, J3
	Portsmouth, Ohio	5.10 P7	6.275 P7						6.40 P7			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 W3, W5	6.275 W3, F3, W5	6.875 W3, W5, 7.50 W3*	7.225 W3, W5	7.525 W3	9.275 W3			\$10.40 W5, W3	\$9.10 W3, W5	7.85 W5
SOUTH	Youngstown, Ohio	5.10 U1, Y1	6.275 Y1	7.50 J3*	6.775 Y1	7.525 Y1	9.275 Y1		6.40 Y1			
	Fontana, Cal.	5.825 K1	7.40 K1			8.25 K1	10.40 K1			\$11.05 K1	\$9.75 K1	
	Geneva, Utah	5.20 C7										
	Kansas City, Mo.								6.65 S2			
	Los Angeles, Torrance, Cal.								7.20 B2			
	Minneapolis, Colo.								6.65 C6			
	San Francisco, Niles, Pittsburg, Cal.	5.80 C7	7.225 C7	7.625 C7					7.20 C7	\$11.05 C7	\$9.75 C7	
	Atlanta, Ga.											
	Fairfield, Ala. Alabama City, Ala.	5.10 T2, R3	6.275 T2, R3	6.875 T2, R3	6.775 T2				6.40 T2, R3	\$10.50 T2	\$9.20 T2	
	Houston, Texas								6.65 S2			

* Electroplated sheets.

(Effective Sept. 14, 1959)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL
PRICES

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	
EAST	Bethlehem, Pa.				6.725 B3	9.825 B3	8.30 B3					
	Buffalo, N. Y.	5.675 R3,B3	5.675 R3,B3	7.70 B5	6.725 B3,R3	9.825 B3,B5	8.30 B3	5.30 B3				8.00 W6
	Claymont, Del.							5.30 C4		7.50 C4	7.95 C4	
	Coatesville, Pa.							5.30 L4		7.50 L4	7.95 L4	
	Conschocken, Pa.							5.30 A2	6.375 A2	7.50 A2	7.95 A2	
	Harrisburg, Pa.							5.30 P2	6.375 P2			
	Milton, Pa.	5.825 M7	5.825 M7									
	Hartford, Conn.			8.15 R3		9.325 R3						
	Johnstown, Pa.	5.675 B3	5.675 B3		6.725 B3		8.30 B3	5.30 B3		7.50 B3	7.95 B3	8.00 B3
	Fairless, Pa.	5.825 U1	5.825 U1		6.875 U1							
	Newark, Camden, N. J.			8.10 W10, P10		9.20 W10, P10						
	Bridgeton, Putnam, Willamantic, Conn.			8.20 W10 8.15 J3	6.00 N8	9.175 N8						
	Sparrows Pt., Md.		5.675 B3					5.30 B3		7.50 B3	7.95 B3	8.10 B3
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 B5, C14		9.325 A5,B5						8.30 A5, W6
	Spring City, Pa.			8.10 K4		9.20 K4						
MIDDLE WEST	Alton, Ill.	5.875 L1										8.20 L1
	Ashland, Newport, Ky.							5.30 A7, A9		7.50 A9	7.95 A7	
	Canton, Massillon, Mansfield, Ohio	6.15* R3		7.65 R3,R2	6.725 R3 6.475 T5	9.825 R3,R2 8.775 T5		5.30 E2				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 U1,R3, W8,N4,P13	5.675 U1,R3, N4,P13,W8 5.875 L1	7.65 A5, W10,W8, B5,L2,N9	6.725 U1,R3, W8	9.825 A5, W10,W8, L2,N8,B5	8.30 U1,W8, R3	5.30 U1,A1, W8,I3	6.375 U1	7.50 U1, W8	7.95 U1, W8	8.00 A5,R3, W8,N4, K2,W7
	Cleveland, Elyria, Ohio	5.675 R3	5.675 R3	7.65 A5,C13, C18		9.825 A5, C13,C18	8.30 R3	5.30 R3,J3	6.375 J3		7.95 R3,J3	8.00 A5, C13,C18
	Detroit, Mich.	5.675 G3	5.675 G3	7.90 P3 7.85 P8,B5 7.65 R5	6.725 R5,G3	9.825 R5 9.225 B5,P3, P8	8.30 G3	5.30 G3		7.50 G3	7.95 G3	
	Duluth, Minn.											8.00 A5
	Gary, Ind. Harbor, Crawfordville, Hammond, Ind.	5.675 U1,I3, Y1	5.675 U1,I3, Y1	7.65 R3,J3	6.725 U1,I3, Y1	9.825 R3,M4	8.30 U1,Y1	5.30 U1,I3, Y1	6.375 J3, I1	7.50 U1, Y1	7.95 U1, Y1,I3	8.10 M4
	Granite City, Ill.							5.40 G2				
	Kokomo, Ind.		5.775 C9									8.10 C9
	Sterling, Ill.	5.775 N4	5.775 N4					5.30 N4				8.10 K2
	Niles, Warren, Ohio Sharon, Pa.			7.65 C10	6.725 C10	9.825 C10		5.30 R3,S1		7.50 S1	7.95 R3, S1	
	Owensboro, Ky.	5.675 G5			6.725 G5							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 U1,J3	5.675 U1,J3	7.85 A5,B4, R3,J3,C11, W10,S9,C8, M9	6.725 U1,J3, C11,B7	9.825 A5, W10,R3,S9, C11,C8,M9	8.30 U1,J3	5.30 U1,J3	6.375 U1,J3	7.50 U1, J3,B7	7.95 U1, J3,B7	8.00 A5, J3,P6
	Portsmouth, Ohio											8.00 P7
WEST	Weirton, Wheeling, Follansbee, W. Va.							5.30 W5				
	Youngstown, Ohio	5.675 U1,R3, Y1	5.675 U1,R3, Y1	7.85 A1,Y1, F2	6.725 U1,Y1	9.825 Y1,F2	8.30 U1,Y1	5.30 U1, R3,Y1		7.50 Y1	7.95 U1,Y1	8.00 Y1
	Emeryville, Fontana, Cal.	6.425 J5 6.375 K1	6.425 J5 6.375 K1		7.775 K1		9.00 K1	6.10 K1		8.30 K1	8.75 K1	
	Geneva, Utah							5.30 C7			7.95 C7	
	Kansas City, Mo.	5.925 S2	5.925 S2		6.975 S2		8.55 S2					8.25 S2
	Los Angeles, Torrance, Cal.	6.375 C7,B2	6.375 C7,B2	9.10 R3,P14, S12	7.775 B2	11.00 P14, S12	8.625 B2					8.95 B2
	Minneapolis, Colo.	6.125 C6	6.125 C6					6.15 C6				8.25 C6
	Portland, Ore.	6.425 O2	6.425 O2									
	San Francisco, Niles, Pittsburg, Cal.	6.375 C7 6.425 B2	6.375 C7 6.425 B2				8.675 B2					8.95 C7,C6
	Seattle, Wash.	6.425 B2,N6, A10	6.425 B2,A10				8.675 B2	6.20 B2		8.40 B2	8.85 B2	
SOUTH	Atlanta, Ga.	5.875 A8	5.875 A8									8.00 A8
	Fairfield City, Ala. Birmingham, Ala.	5.675 T2,R3, C16	5.675 T2,R3, C16	8.25 C16			8.30 T2	5.30 T2,R3			7.95 T2	8.00 T2,R3
	Houston, Ft. Worth, Lone Star, Texas	5.925 S2	5.925 S2		6.975 S2		8.55 S2	5.40 S2		7.60 S2	8.05 S2	8.25 S2

† Merchant Quality—Special Quality 35¢ higher.

(Effective Sept. 14, 1959)

* Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

- A1 Acme Steel Co., Chicago
- A2 Alan Wood Steel Co., Conshohocken, Pa.
- A3 Allegheny Ludlum Steel Corp., Pittsburgh
- A4 American Cladmetals Co., Carnegie, Pa.
- A5 American Steel & Wire Div., Cleveland
- A6 Angel Nail & Chaplet Co., Cleveland
- A7 Armo Steel Corp., Middletown, Ohio
- A8 Atlantic Steel Co., Atlanta, Ga.
- A9 Acme-Newport Steel Co., Newport, Ky.
- A10 Alaska Steel Mills, Inc., Seattle, Wash.
- B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
- B2 Bethlehem Steel Co., Pacific Coast Div.
- B3 Bethlehem Steel Co., Bethlehem, Pa.
- B4 Blair Strip Steel Co., New Castle, Pa.
- B5 Bliss & Laughlin, Inc., Harvey, Ill.
- B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
- B7 A. M. Byers, Pittsburgh
- B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
- C1 Calstrip Steel Corp., Los Angeles
- C2 Carpenter Steel Co., Reading, Pa.
- C3 Claymont Products Dept., Claymont, Del.
- C4 Colorado Fuel & Iron Corp., Denver
- C5 Columbia Geneva Steel Div., San Francisco
- C6 Columbia Steel & Shifting Co., Pittsburgh
- C7 Continental Steel Corp., Kokomo, Ind.
- C8 Copperweld Steel Co., Pittsburgh, Pa.
- C9 Crucible Steel Co. of America, Pittsburgh
- C10 Cuyahoga Steel & Wire Co., Cleveland
- C11 Compressed Steel Shifting Co., Readville, Mass.
- C12 G. O. Carlson, Inc., Thornhale, Pa.
- C13 Connors Steel Div., Birmingham
- C14 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
- D1 Detroit Steel Corp., Detroit
- D2 Driver, Wilbur B. Co., Newark, N. J.
- D3 Driver Harria Co., Harrison, N. J.
- D4 Dickson Weatherproof Nail Co., Evanston, Ill.
- E1 Eastern Stainless Steel Corp., Baltimore
- E2 Empire-Reeves Steel Corp., Mansfield, O.
- E3 Enamel Products & Plating Co., McKeesport, Pa.
- F1 Firth Sterling, Inc., McKeesport, Pa.
- F2 Fitzsimons Steel Corp., Youngstown
- F3 Follansbee Steel Corp., Follansbee, W. Va.

- G2 Granite City Steel Co., Granite City, Ill.
- G3 Great Lakes Steel Corp., Detroit
- G4 Greer Steel Co., Dover, O.
- G5 Green River Steel Corp., Owensboro, Ky.
- H1 Hanna Furnace Corp., Detroit
- I2 Ingersoll Steel Div., New Castle, Ind.
- I3 Inland Steel Co., Chicago, Ill.
- I4 Interlake Iron Corp., Cleveland
- J1 Jackson Iron & Steel Co., Jackson, O.
- J2 Jessop Steel Corp., Washington, Pa.
- J3 Jones & Laughlin Steel Corp., Pittsburgh
- J4 Joslyn Mig. & Supply Co., Chicago
- J5 Judson Steel Corp., Emeryville, Calif.
- K1 Kaiser Steel Corp., Fontana, Calif.
- K2 Keystone Steel & Wire Co., Peoria
- K3 Koppers Co., Granite City, Ill.
- K4 Keystone Drawn Steel Co., Spring City, Pa.
- L1 Lackde Steel Co., St. Louis
- L2 La Salle Steel Co., Chicago
- L3 Lone Star Steel Co., Dallas
- L4 Lukens Steel Co., Coatesville, Pa.
- M1 Mahoning Valley Steel Co., Niles, O.
- M2 McLouth Steel Corp., Detroit
- M3 Mercer Tube & Mig. Co., Sharon, Pa.
- M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
- M6 Mystic Iron Works, Everett, Mass.
- M7 Milton Steel Products Div., Milton, Pa.
- M8 Mill Strip Products Co., Chicago, Ill.
- M9 Moltup Steel Products Co., Beaver Falls, Pa.
- N1 National Supply Co., Pittsburgh
- N2 National Tube Div., Pittsburgh
- N4 Northwestern Steel & Wire Co., Sterling, Ill.
- N6 Northwest Steel Rolling Mills, Seattle
- N7 Newman Crosby Steel Co., Pawtucket, R. I.
- N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
- N9 Nelson Steel & Wire Co.
- O1 Oliver Iron & Steel Co., Pittsburgh
- O2 Oregon Steel Mills, Portland
- P1 Page Steel & Wire Div., Monessen, Pa.
- P2 Phoenix Steel Corp., Phoenixville, Pa.
- P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
- P4 Pittsburgh Coke & Chemical Co., Pittsburgh
- P5 Pittsburgh Screw & Bolt Co., Pittsburgh
- P6 Pittsburgh Steel Co., Pittsburgh
- P7 Portsmouth Div., Detroit Steel Corp., Detroit
- P8 Plymouth Steel Co., Detroit

- P9 Pacific States Steel Co., Niles, Calif.
- P10 Precision Drawn Steel Co., Camden, N. J.
- P11 Production Steel Strip Corp., Detroit
- P13 Phoenix Mig. Co., Joliet, Ill.
- P14 Pacific Tube Co.
- P15 Philadelphia Steel and Wire Corp.
- R1 Reeves Steel & Mig. Div., Dover, O.
- R2 Reliance Div., Eaton Mig. Co., Massillon, O.
- R3 Republic Steel Corp., Cleveland
- R4 Roebbing Sons Co., John A., Trenton, N. J.
- R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
- R6 Rodney Metals, Inc., New Bedford, Mass.
- R7 Rome Strip Steel Co., Rome, N. Y.
- S1 Sharon Steel Corp., Sharon, Pa.
- S2 Sheffield Steel Div., Kansas City
- S3 Shenango Furnace Co., Pittsburgh
- S4 Simonds Saw and Steel Co., Fitchburg, Mass.
- S5 Sweet's Steel Co., Williamsport, Pa.
- S7 Stanley Works, New Britain, Conn.
- S8 Superior Drawn Steel Co., Monaca, Pa.
- S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
- S10 Seneca Steel Service, Buffalo
- S11 Southern Electric Steel Co., Birmingham
- S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
- S13 Seymour Mig. Co., Seymour, Conn.
- T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
- T2 Tennessee Coal & Iron Div., Fairfield
- T3 Tennessee Products & Chem. Corp., Nashville
- T4 Thomas Strip Div., Warren, O.
- T5 Timken Steel & Tube Div., Canton, O.
- T7 Texas Steel Co., Fort Worth
- T8 Thompson Wire Co., Boston
- U1 United States Steel Corp., Pittsburgh
- U2 Universal-Cyclaps Steel Corp., Bridgeville, Pa.
- U3 Ulbrich Stainless Steels, Wallingford, Conn.
- U4 U. S. Pipe & Foundry Co., Birmingham
- W1 Wallingford Steel Co., Wallingford, Conn.
- W2 Washington Steel Corp., Washington, Pa.
- W3 Weirton Steel Co., Weirton, W. Va.
- W4 Wheatland Tube Co., Wheatland, Pa.
- W5 Wheeling Steel Corp., Wheeling, W. Va.
- W6 Wickwire-Spencer Steel Div., Buffalo
- W7 Wilson Steel & Wire Co., Chicago
- W8 Wisconsin Steel Div., S. Chicago, Ill.
- W9 Woodward Iron Co., Woodward, Ala.
- W10 Wyckoff Steel Co., Pittsburgh
- W12 Wallace Barnes Steel Div., Bristol, Conn.
- Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (per cent) L & S. mills. Base price about \$200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	1/2 in.		3/4 in.		1 in.		1 1/4 in.		1 1/2 in.		2 in.		2 1/2-3 in.		2 in.		2 1/2 in.		3 in.		3 1/2-4 in.	
	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.
Sparrows Pt. B3.....	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown R3.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana K1.....	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh J3.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*28.0	*1.75	*18.50
Alton, Ill. L1.....	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon M3.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless N2.....	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh N1.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*28.0	*1.75	*18.50
Wheeling W5.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland W4.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*28.0	*1.75	*18.50
Youngstown Y1.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Indiana Harbor Y1.....	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain N2.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*28.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. B3.....	4.75	*9.0	8.75	*5.0	11.75	*8.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown R3.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless N2.....	4.75	*9.0	8.75	*5.0	11.75	*8.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana K1.....	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh J3.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. L1.....	4.75	*9.0	8.75	*5.0	11.75	*8.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon M3.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh N1.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling W5.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland W4.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown Y1.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor Y1.....	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain N2.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, butt weld and seamless, 2 1/4 pt. higher discount. Plain ends, butt weld and seamless, 3-in. and under, 5/16 pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.00¢ per lb.
(Effective Sept. 14, 1959)

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	41.00
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	\$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	\$3.60 to \$3.95
Nickel	\$1.05 to \$1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	\$1.07
Stainless Steel, 316	\$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.35+%, per lb., f.o.b.	\$11.25
Tungsten	\$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
1/2" and smaller x 3"	55	57	61	62
3/4" diam. x 3" and shorter	47	49 1/2	54	55
3/4" thru 1" diam x 6" and shorter	37	39 1/2	45	46
1 1/2" thru 1" diam. longer than 6" and 1 1/2" and larger x all lengths	31	34	40	41
Roller thread, 1/2" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts 1/2" and smaller x 6" and shorter	48	50 1/2	55	56

Note: Add 25 pct for less than container quantity.
Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
1/2 in. or smaller	62
3/4 in. to 1 1/2 in. inclusive	56
1 1/2 in. and larger	51 1/2

C. P. Hex, reg. & hvy.	Full case or Keg price
1/2 in. or smaller	62
3/4 in. to 1 1/2 in. inclusive	56
1 1/2 in. and larger	51 1/2

Hot Galv. Hex Nuts (All Types)	Full case or Keg price
1/2 in. and smaller	41

Semi-finished Hex Nuts	Full case or Keg price
1/2 in. or smaller	62
3/4 in. to 1 1/2 in. inclusive	56
1 1/2 in. and larger	51 1/2
(Add 25 pct for broken case or keg quantities)	

Finished	Full case or Keg price
1/2 in. and smaller	65

Rivets	Base per 100 lb
1/2 in. and larger	\$12.85
7/16 in. and smaller	Pct. Off List 15

Cap Screws	Discount (Packages)
Full Finished H. C. Heat Treat	
New std. hex head, pack-aged	Full Case

1/2" diam. and smaller x 6" and shorter	54	43
3/4", 1/2", and 1" diam. x 6" and shorter	38	23
1/2" diam. and smaller x longer than 6"	..	..
3/4", 1/2", and 1" diam. x longer than 6"	..	..
1/4" through 3/4" dia. x 6" and shorter	59	48
3/4" through 1" dia. x 6" and shorter	45	33
Minimum quantity—1/4" through 3/4" diam., 15,000 pieces; 7/16" through 1" diam., 5,000 pieces; 3/4" through 1" diam., 2,000 pieces.		

Machine Screws & Stove Bolts

Plain Finish	Discount	Mach. Screws	Stove Bolts
Cartons	60	60	60
Bulk			
To 1/4" diam. incl.	25,000-and over	60	..
5/16 to 3/4" diam. incl.	15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

In Cartons	Discount	Hex	Square
	16	19	
In Bulk			
1/2" diam. & smaller	25,000-and over	15	16

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities		Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	City Delivery ¹ Charge	Hot-Rolled (18 ga. & hvy.)	Cold-Rolled (15 gage)	Galvanized (10 gage) ^{††}	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold- Finished	Hot-Rolled 4015 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4015 As rolled	Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24*				
Baltimore	\$ 10	8.65	9.35	9.09	9.15	9.10	9.65	9.55	11.80*	16.28	15.28	19.82	19.08
Birmingham		8.18	9.45	10.46	8.51	8.89	9.00	8.99					
Boston**	10	10.52	11.27	11.82	12.17	10.42	10.72	10.34	13.45*	16.79	16.69	20.29	21.04
Buffalo**	15	9.80	10.50	11.35	11.30	10.25	10.40	9.90	11.60*	16.34	16.45	19.01	20.80
Chicago**	15	8.69	10.35	11.05	10.35	8.62	9.16	8.79	10.80	16.20	16.10	19.70	20.45
Cincinnati**	15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.65*	16.52	16.42	20.02	20.77
Cleveland**	15	8.69 ¹	9.89	11.02	10.47	8.88	9.67	8.90	11.40*	16.31	16.21	19.81	20.56
Denver	20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84
Detroit**	15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	15.46	16.38	18.81	21.03
Houston		8.10	8.60		8.15	8.45	8.05	8.10	11.60	16.20	15.25	19.65	18.95
Kansas City	15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95 ¹	11.55	12.20	11.55	10.00	10.00	9.10	14.29	17.30	16.45	21.30	20.80
Memphis	15	8.55	9.80		8.60	8.93	9.01	8.97	12.11*				
Milwaukee**	15	8.83	10.49	11.19	10.49	8.76	9.30	8.93	11.04	16.34	15.34	19.84	19.09
New York**	10	10.52	10.59	11.40	12.14	10.77	10.84	10.09	13.35*	16.16	16.50	20.10	20.85
Norfolk	20	8.20			8.90	8.45	9.20	8.90	10.70				
Philadelphia**	10	9.55	10.10	10.71	11.75	10.15	10.20	9.50	12.05*	16.58	16.48	20.08	20.83
Pittsburgh**	15	8.69	9.84	10.91	10.45	8.62	9.78	8.79	11.40*	16.20	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30*	18.50	17.45	20.75	20.25
San Francisco**	10	11.00	11.95 ²	11.50	12.25	11.00	10.95	10.75	15.20	17.05	16.35	21.05	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	17.15	17.80	20.65	22.20
Spokane**	15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.55	22.35
St. Louis**	15	9.07	10.73	11.02	10.73	9.00	9.76	9.17	11.43	16.58	16.48	20.08	19.33
St. Paul	15	8.94	9.31	10.47	8.99	9.45	9.53	9.70	11.49		15.41		20.83

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—1/4" x 1" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—3/4-2 1/2 1/16; * C 1018—1" rounds. †† 10¢ zinc. ‡ Deduct for country delivery. * 15 ga. & heavier; * 24 ga. & lighter.

(Effective Sept. 14, 1959)

PIG IRON

Dollars per gross ton, f.a.b.,
subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Best.	Low Phos.
Birdsboro, Pa. B6	68.00	68.50	69.00	69.50	.....
Birmingham R3	62.00	62.50*	63.00	63.50	.....
Birmingham W9	62.00	62.50*	63.00	63.50	.....
Birmingham U4	62.00	62.50*	63.00	63.50	.....
Buffalo R3	66.00	66.50	67.00	67.50	.....
Buffalo H1	66.00	66.50	67.00	67.50	.....
Buffalo W6	66.00	66.50	67.00	67.50	.....
Chester P2	68.00	68.50	69.00	69.50	.....
Chicago I4	68.00	68.50	69.00	69.50	.....
Cleveland A5	66.00	66.50	67.00	67.50	71.00†
Cleveland R3	66.00	66.50	67.00	67.50	71.00†
Duluth I4	66.00	66.50	67.00	67.50	71.00†
Erie I4	66.00	66.50	67.00	67.50	71.00†
Everett M6	67.50	68.00	68.50	69.00	71.00†
Fontana K1	75.00	75.50	76.00	76.50	.....
Geneva, Utah C7	66.00	66.50	67.00	67.50	.....
Granite City G2	67.50	68.00	68.50	69.00	.....
Hubbard Y1	66.00	66.50	67.00	67.50	.....
Ironton, Utah C7	66.00	66.50	67.00	67.50	.....
Midland C11	68.00	68.50	69.00	69.50	.....
Minneapolis C6	66.00	66.50	67.00	67.50	.....
Monessen P6	66.00	66.50	67.00	67.50	.....
Neville Ia. P4	66.00	66.50	67.00	67.50	71.00†
N. Tonawanda T1	66.00	66.50	67.00	67.50	.....
Sharpville S3	66.00	66.50	67.00	67.50	.....
So. Chicago R3	66.00	66.50	67.00	67.50	.....
So. Chicago W8	66.00	66.50	67.00	67.50	.....
Swedeland A2	66.00	66.50	67.00	67.50	.....
Toledo I4	66.00	66.50	67.00	67.50	.....
Troy, N. Y. R3	68.00	68.50	69.00	69.50	73.00
Youngstown Y1	66.00	66.50	67.00	67.50	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, \$2 per ton for 0.50 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Add \$1.00 for 0.31-0.50 pct phosphorus.

Silvery Iron: Buffalo (6 pct), H1, \$79.25; Jackson J1, I4 (Globe Div.), \$78.00; Niagara Falls (15.01-15.50), \$101.00; Kokuk (14.01-14.50), \$103.50; (15.51-16.00), \$106.50. Add \$1.00 per ton for each 0.50 pct silicon over base (0.01 to 0.50 pct) up to 18 pct. Add \$1.25 for each 0.50 pct manganese over 1.00 pct. Base for silvery pig iron (under .10 pct phosphorus); \$64.00. Add \$1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.a.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingot, re-roll	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25-31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	60.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, Md., E1; Middletown, O., A7; Massillon, O., R3; Gary, Ind., U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Detroit, Mich., M2; Louisville, O., R5.

Strip: Midland, Pa., C11; Waukegan, Ill., A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Lechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, Mich., M2; Detroit, Mich., S1; Canton, Massillon, O., R3; Harrison, N. J., D3; Youngstown, Pa., R5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extras); W1 (25¢ per lb. higher); Seymour, Conn., S13 (25¢ per lb. higher); New Bedford, Mass., R6; Gary, Ind., U1 (25¢ per lb. higher); Baltimore, Md., E1 (300 series only).

Bar: Baltimore, Md., A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R5; S. Chicago, Ill., U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, Ill., A5; Canton, O., T5, R3; Ft. Wayne, Ind., I4; Detroit, Mich., R5; Gary, Ind., U1; Owensboro, Ky., G5; Bridgeport, Conn., N8; Ambridge, Pa., B7.

Wire: Waukegan, Ill., A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, Ind., J4; Newark, N. J., D2; Harrison, N. J., D3; Baltimore, Md., A7; Dunkirk, N. Y., A3; Monessen, Pa., P1; Syracuse, N. Y., C11; Bridgeville, Pa., U2; Detroit, Mich., R5; Reading, Pa., C2; Bridgeport, Conn., N8.

Structurals: Baltimore, Md., A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, N. Y., C11; S. Chicago, Ill., U1.

Plates: Ambridge, Pa., B7; Baltimore, Md., A7; Brackenridge, Pa., A3; Chicago, Ill., U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, O., A7; Washington, Pa., J2; Cleveland, Massillon, O., R3; Coatesville, Pa., C15; Vandergrift, Pa., U1; Gary, Ind., U1.

Forging billets: Ambridge, Pa., B7; Midland, Pa., C11; Baltimore, Md., A7; Washington, Pa., J2; McKeesport, Pa., F1; Massillon, O., R3; Watervliet, N. Y., A3; Pittsburgh, Pa., U1; Syracuse, N. Y., C11; Detroit, Mich., R5; Munhall, Pa., S. Chicago, Ill., U1; Owensboro, Ky., G5; Bridgeport, Conn., N8; Reading, Pa., C2.

(Effective Sept. 14, 1959)

MACHINE WORK & SPECIAL MACHINE BUILDING

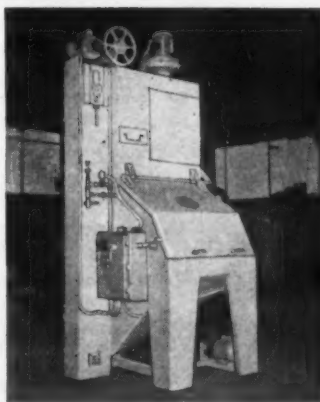
We have large, medium and small machine tools available for machine work and the building of special machinery.

We will be pleased to receive your inquiries.

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BUILDING & DRYDOCK COMPANY
CHESTER, PA.

MACLEOD



BLAST
CLEANING
EQUIPMENT
•
CUSTOM
DESIGNED
to your
INDIVIDUAL
REQUIREMENTS
•

Since 1897, MACLEOD has won an excellent reputation as a manufacturer of "tailor-made" blast cleaning equipment. The shot-peening machine shown above, for instance, was specially designed and built to meet the customer's exact requirements and specifications. Among other distinctive features, the machine includes an elevator and a dust collecting section. Shot peening cycle is timer-controlled and turntable is motor driven. Write for descriptive literature on all MACLEOD Blast Cleaning Equipment—Rooms, Cabinets, Machines, and Dust Arresters—that can be custom-designed to your individual requirements.



The **MACLEOD** Company
44 MOSTELLER RD. CINCINNATI 41, OHIO

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, 30-1.00% max. Si.			
0.02% C.....	41.00	0.50% C.....	38.00
0.03% C.....	39.00	1.00% C.....	37.75
0.10% C.....	38.50	1.50% C.....	37.50
0.20% C.....	38.25	2.00% C.....	37.25
4.00-4.50% C, 60-70% Cr, 1-2% Si..	37.25		
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si	28.25		
0.025% C (Simplex)	39.75		
8% max C, 50-55% Cr, 6% max Si.	25.75		
4½% max C, 50-55% Cr, 2% max Si	26.50		

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.	
0.10% max. C	\$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (¼" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.	
Carloads	\$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.		
Price is sum of contained Cr and contained Si.		
	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 20-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese-Silicon

Cents per lb of alloy, lump, delivered, packed.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.	
Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.	
Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point		Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.		12.25
Johnstown, Pa.		12.25
Neville Island, Pa.		12.25
Sheridan, Pa.		12.25
Philo, Ohio		12.25
S. Duquesne		12.25
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.		
Briquets, delivered, 66 pct Mn:		
Carloads, bulk	14.80	
Ton lots packed in bags	17.20	

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.	
Manganese Silicon	
16 to 19% 3% max.	\$100.50
19 to 21% 3% max.	102.50
21 to 23% 3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn	
	\$5.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.			
	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk)			
P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.	
Carloads bulk	12.80
Ton lots, packed	14.45
Carloads, bulk, delivered, per lb of briquet	15.10
Briquets, packed pallets, 2000 lb up to carloads	17.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	
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Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.		
	Ton lots,	Carloads,
98.25% Si, 0.50% Fe	22.45	21.25
99% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.	
Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.	
50% Si	14.60
50% Si	15.75
65% Si	15.75
75% Si	16.90
85% Si	18.60
90% Si	20.00

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.	
Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.		
	Cast	Turnings Distilled
Ton lots	\$2.05	\$2.95
100 to 1999 lb.	2.40	3.30
		4.55

(Effective Sept. 14, 1959)

Alsiifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo

	\$1.50
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Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots	\$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta

	\$3.40
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Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo

	\$1.76
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Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$5.00 unitage, per gross ton

	\$120.00
10 tons to less carload	\$131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti

	\$1.35
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Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti

	\$1.50
Less ton lots	\$1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton

	\$255.00
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Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered

	\$2.15
(nominal)	

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa.

	\$1.49
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bags, f.o.b. Washington, Pa., Langeloth, Pa.

	\$1.38
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Simanol, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V₂O₅ per pound contained V₂O₅

	\$1.38
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Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk, 12-15%, del'd lump, bulk-carloads

	26.25¢
	9.25¢

Boron Agents

Borasil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload	\$5.50
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Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound

	30¢
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Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	18.25¢
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Ferroboration, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots...

F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up	
10 to 14% B .....	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight allowed, 100 lb and over

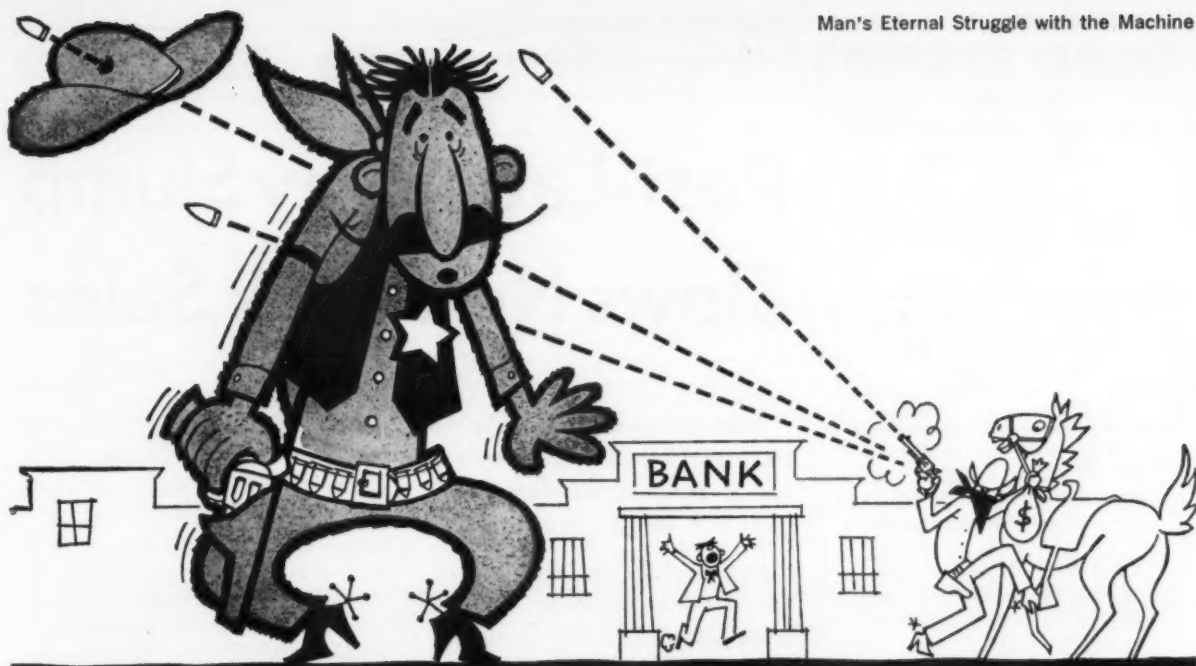
No. 1	\$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	\$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots

	2.15
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COMPETITIVE PRESSURES AND RISING COSTS DEMAND GREATER PRODUCTION EFFICIENCY THAN EVER BEFORE

Have you ever wished you worked in a nice, quiet little shop...?

Sure you have.

The chances are you don't work in one now. There just aren't any nice, quiet little shops anymore. Everybody's out to make a buck. And they all seem to be competitors of yours.

Like everybody else's, your shop is full of complex equipment. Production is rough on the best of it. Eventual breakdown of some sort is almost inevitable. Even though your maintenance people can satisfy most of the problems, what happens when something goes wrong they can't handle?

With your production held up by a breakdown, you can't afford a vendor who passes the buck for service to all the suppliers of his components!

And what about that new equipment you're going to buy? Probably the latest in design. Most likely something your service people don't know anything about at all! Yet, it's got to get into production fast, and stay in as consistently as possible. With your production waiting, you can't afford to test and prove the vendor's machine for him!

Sciaky has always accepted *full responsibility* for its resistance welding and production equipment. Sciaky equipment is designed and built to do the job it was sold to do. That's why it's tested and proved *before shipment*. That's why the Sciaky Service Organization is on call anytime to service Sciaky equipment when necessary.

Why take less than the full advantage of consulting with a Sciaky Application Engineer the next time you're considering equipment. No obligation, of course.

Sciaky Service is a plus-feature that has been wanted by customers all over the world. Why take a chance on service that's sometimes needed on even the best machines. Why, to be sure, when you can enjoy the service facility that has been the difference between expensive production stoppages and minor delays.



75A

SCI AKY BROS., INC., 4923 W. 67th STREET, CHICAGO 38, ILLINOIS

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RAILWAY EQUIPMENT

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RAILWAY CARS

All Types

SERVICE-TESTED
FREIGHT CAR REPAIR
PARTS

For All Type of Cars

3—DIESEL-ELECTRIC LOCOMOTIVES

General Electric
44-Ton Standard Gauge
In ICC Operating Condition

10 Covered Hopper Cars
70-Ton Capacity, Standard Gauge

2—RAILROAD TRACK SCALES

1—150-Ton, Heavy Duty, 60"
1—125-Ton, 52'6"

RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000-Gallon
Cleaned and Tested

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Suite 1608-9, 51-B E. 42nd St.
New York 17, N. Y.
Phone: YUkon 6-4766

"ANYTHING containing IRON or STEEL"

REBUILT — GUARANTEED ELECTRICAL EQUIPMENT

DIRECT CURRENT MOTORS

Qu.	H.P.	Make	Type	Volts	R.P.M.
2**	3000	Whse.	Rev.	600	600
1**	2200	Whse.	Vent.	600	92/132
4**	1500	Whse.	Rev.	600	600
4**	700	Whse.	Vent.	250	300/700
2**	645	S.&S.	Rev.	300	1000
2	600	Al.Ch.	Mill	600	300/600
1	600	Whse.	Mill	250	110/220

SLIP RING MOTORS

3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	2500	Al.Ch.	Mill	2300	296
2	1800	Whse.	Mill	2300	252
1	1500	G.E.	Mill 6000/4160-V.	444	444
1	1000	Whse.	C.W.	2200	441
1	500	Ideal	S-4-20	4800	708
1	500	G.E.	MT-410	2200	585
1	500	Al.Ch.	ANY	2200	505
1	500	Al.Ch.	ANY	2200	293
1	400	Al.Ch.	ANY	2200	305
1	400	Whse.	C.W.	2200	290
1	350	G.E.	1-15-M	2200	1180
1	350	G.E.	MT-415	2200	450
1	300	Whse.	CW-1012	2200	704
1	300	G.E.	1-15B-M	440	1200

SYNCHRONOUS MOTORS

3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1	5600	Whse.		4760	1200
2	1400	Whse.		4160	450
1	960	G.E.		460	300
1	700	El. Mch.		440	200
1	500	El. Mch.		2300	720
1	450	Whse.		220	128
1	300	G.E.		2300	600
1	200	Whse.		440	600

T. B. MAC CABE COMPANY

4302 Clarissa St., Philadelphia 40, Penna.

Cable Address

Phone

"Macsteel" Philadelphia, Pa.

Devonport 4-8300

THE CLEARING HOUSE

Post-Labor Day Slump Slows New York Sales

Used machinery dealers in the New York area are experiencing a business slowdown they hope will only be temporary.

The steel strike, increased interest rates on loans and the closing stages of the construction season have caused the letdown.

■ After a healthy summer, used machinery business in the New York area is slipping into the doldrums. Some dealers are still riding the summer sales crest, but the majority report a post-Labor Day slump.

How long business will languish is anybody's guess, but few look for a pickup until the steel strike is settled. Stoppage in steel is by no means the only cause of the present tool slump, but it is a major one. Dealers explain it this way: Smaller plants are inevitably an important factor in used machinery. And the small plant is precisely the one that found it hardest to stock up on steel last spring. Further, many of these small shops are subcontractors, who now can't find the metal that would permit them to accept new business. To make it worse, these shops realize there will be a considerable lag after the strike is settled before they can count on new steel supplies.

Marking Time—Many have no choice but to mark time. Expansion plans are being postponed, as evidenced by suspension of interest in cranes. Even those dealers who still report good sales admit that in-

quiries are off. "There's hardly any mail to open," sums up one dealer.

Steel is not the only reason for the present go-slow attitude. Recent hiking of money interest rates has many firms, especially the smaller ones, worried. They are not yet sure how much borrowed money will cost them now, so they tend to hold on to cash. Costlier money will undoubtedly have its long-range effects, but they will probably be weaker than the current uncertainty.

Season Ending—As another brake on sales, the construction season is now in the home stretch. It is unlikely that any more equipment will be ordered for this year's projects. There is always a good market in this area for construction equipment such as ironworkers, shears, press brakes and bending rolls, but actual sales must bear some relation to job horizons. Again, the steel strike has disrupted planning and ordering on long-range projects, with resultant sales slowdown.

1960 Looks Good—Many dealers here feel that business must get worse before it gets better, but there is little long-term pessimism. Most recognize that overall economic outlook for 1960 is good. Industrial expansion plans are robust, despite some present postponements. Customers are generally willing to pay a reasonable price for good tools, and supplies are at least adequate. Weighing all these factors, most dealers are resigned to riding out what they hope will be only a temporary spell of bad sales weather.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS

13' x 3/16" Bertsch Initial Type—New 1957
13' x 3" Bertsch Initial Type—New 1948
32' x 3/4" Baldwin Pyramid Type—New 1942

BRAKE—DOCK & PAN

8' x 3/4" Dreis & Krump, 12" Finger Extension

BRAKES—PRESS TYPE

90 ton Niagara, Model 90-8-10
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15 ton Shepard Niles	55' 6" Span 230/3/60
20 ton P&H	57' 6" Span 230/3/60
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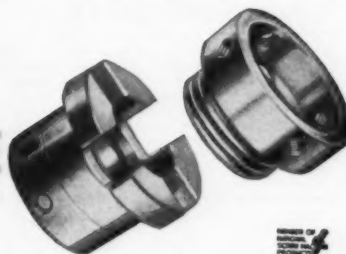


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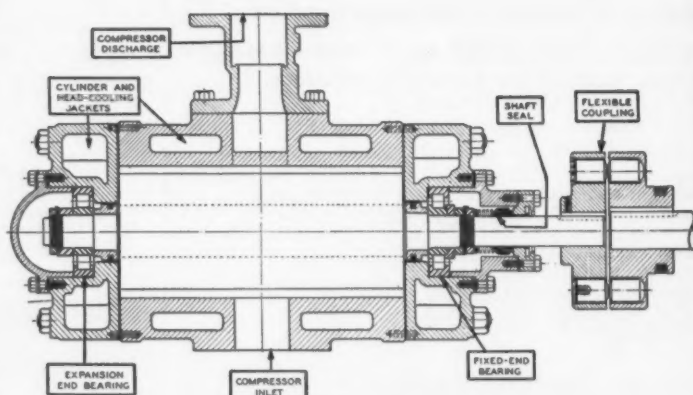
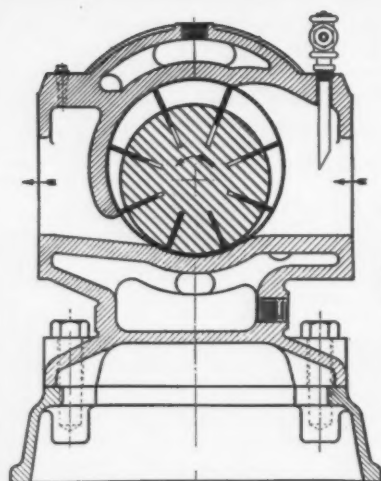
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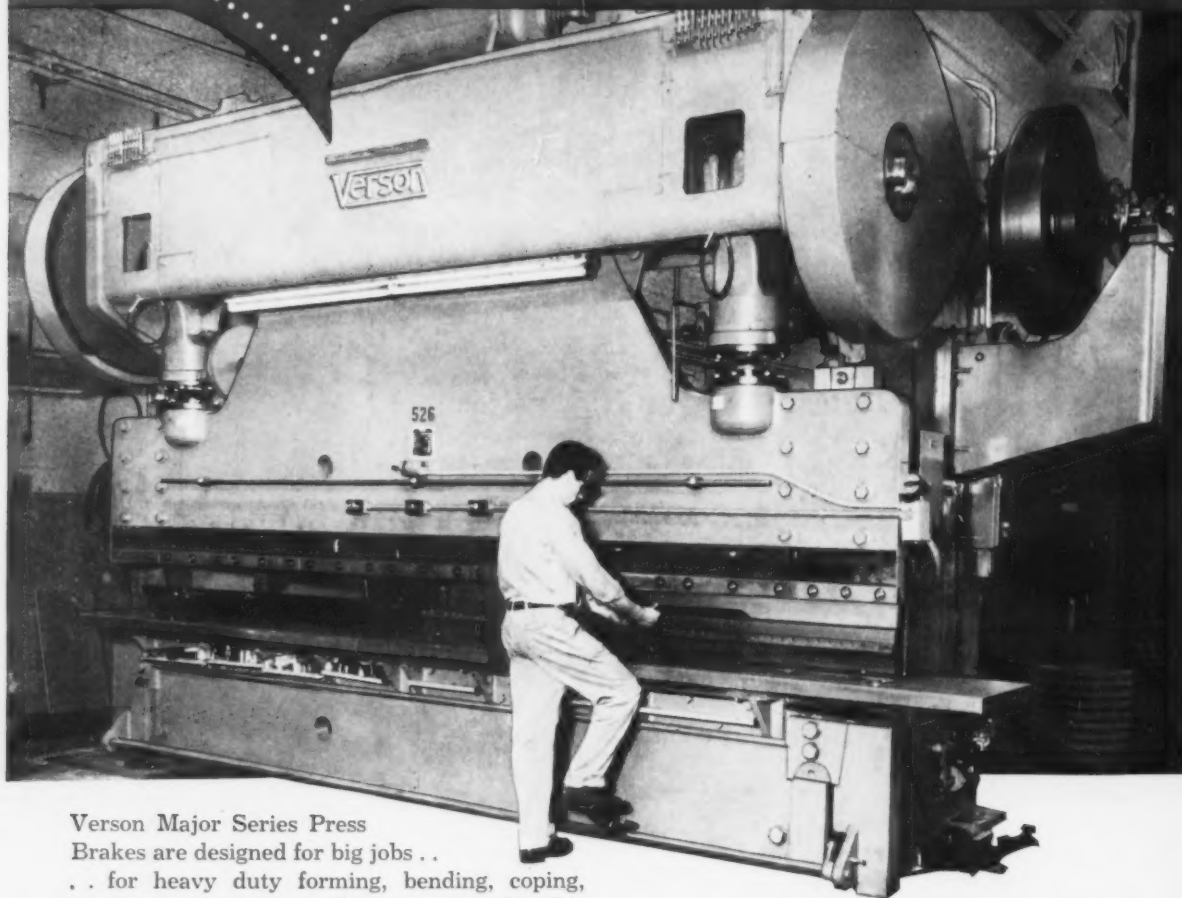


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